# ND1006:2007/05

## TSG/SPEC/006

## Interconnect User Part (IUP)

# TSG SPECIFICATION NUMBER 006
# INTERCONNECT USER PART (IUP)

## 0.2 Normative Information

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## 0.3 Contents

## 0.4  History

| Revision | Date of Issue | Updated By | Description |
|---|---|---|---|
| Issue 3 | May 1999 | PNO-ISC Editors | First Published Version |
| Issue 3.1 | February 2000 | PNO-ISC Editors | Updated Sec. 16 to issue 2.1 |
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## 0.5  Issue Control

| Section | Page | Issue | Date |
|---|---|---|---|
| **0** | **All** | **4.2** | **May 2007** |
| 1 | All | 4.1 | February 2005 |
| 2 | All | 4.1 | February 2005 |
| 3 | All | 4.1 | February 2005 |
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**NOTE:** Sections that are revised in this issue are shown in this table as **bold**.

## 0.6 References

/1/ ND1104:2004/11 (PNO-ISC/INFO/004), Proprietary extensions to IUP

/2/ ND1108:2004/11 (PNO-ISC/INFO/008), UK Management of Partial Calling Line Identity

/3/ ND1201:2000/05 (PNO-ISC/SER/001), UK Completion of Calls to Busy Subscriber Supplementary Service

/4/ ND1202:2000/05 (PNO-ISC/SER/002), Calling Line Identification Presentation (CLIP)& Calling Line Identification Restriction (CLIR) (Incorporating Calling Number Display) Supplementary Services

/5/ ND1206:2000/05 (PNO-ISC/SER/006), High Level Service Description for Targeted Transit

/6/ ND1001:06 (PNO-ISC/SPEC/001), Use of SS7Point Codes for Network Interconnect in the UK

/7/ ND1003:2000/08 (PNO-ISC/SPEC/003) Interconnect Signalling Connection Control Part (SCCP)

/8/ ND10045:1997/04 (PNO-ISC/SPEC/004), C7 Interconnect Transaction Capabilities (TC)

/9/ ND1005:2000/08 (PNO-ISC/SPEC/005), C7 Interconnect Message Transfer Part (MTP)

/10/ Not used

/11/ Not used

/12/ Not used

/13/ Not used

/14/ NICC ND1203:2000/05 (PNO-ISC/SER/003 Issue 1),Geographic Number Portability

/15/ NICC ND1207:2000/05 (PNO-ISC/SER/007 Issue 1), Non Geographic Number Portability

/16/ NICC ND1016:2004/09 (PNO-ISC/SPEC/016 Issue 1), Requirements on Communications Providers in Relation to Customer Line Identification Display Services and Other Related Services

/17/ NICC ND1208:2000/03 (PNO-ISC/SER/008 Issue 1), Mobile Number Portability

/18/ NICC ND1209:1999/05 (PNO-ISC/SER/009 Issue 1), Operator Services

/19/ NICC ND1107:2001/10 (PNO-ISC/INFO/007 Issue 3.1) Interconnect use of SCCP & MTP

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## 0.7  Glossary of Terms

### 0.7.1  Abbreviations

| | |
|---|---|
| ACI | Additional Call Information (message) |
| ACM | Address Complete Message |
| AD&C | Advice of Duration and Charge |
| ADPCM | Adaptive Differential Pulse Code Modulation |
| AMC | Automanual Centre (non-C7) |
| ANS | Answer (message) |
| ARR | Automatic Re-Routeing |
| ASUI | Additional Set Up Information (message) |
| | |
| BCD | Binary Coded Decimal |
| BLA | Blocking Acknowledgement (message) |
| BLO | Blocking (message) |
| | |
| C7 | CCITT Signalling System Number 7 |
| CBI | CLI Blocking Indicator |
| CCBS | Completion of Calls to Busy Subscriber |
| CCF | Circuit Free (message) |
| CCITT | International Telegraph and Telephone Consultative Committee |
| CCSS | Call Completion Supplementary Services |
| CCT | Circuit |
| CDB | Call Drop Back (message) |
| CdPC | Called Party Category |
| CFC | Coin and Fee Checking (message) |
| CFN | Confusion (message) |
| CIC | Circuit Identification Code |
| CLI | Calling Line Identity |
| CLIP | Calling Line Identification Presentation |
| CLIR | Calling Line Identification Restriction |
| CLR | Clear (message) |
| CNA | Connection Not Admitted (message) |
| CND | Calling Number Display |
| CNG | Congestion (message) |
| CNI | Changed Number Interception |
| CPC | Calling Party Category |
| CPE | Customer Premises Equipment |
| CPI | Call Path Indicator |
| CSA | Called Subscriber Answer |
| CSH | Called Subscriber Held |

| | |
|---|---|
| CTI | Call Type Indicator |
| CUG | Closed User Group |
| | |
| DASS2 | Digital Access Signalling System No 2 |
| DCC | Data Country Code |
| DDI | Direct Dialling In |
| DNIC | Data Network Identification Code |
| DPC | Destination Point Code |
| DPNSS | Digital Private Network Signalling System |
| DQ | Directory Enquiries |
| DSS1 | Digital Subscriber Signalling System No1 |
| DTE | Data Terminating Equipment |
| | |
| ECD | Echo Control Device |
| ECM | Extend Call Message |
| ECMA | European Computer Manufacturers' Association |
| EIM | Enveloped-ISUP Message |
| EISM | Enveloped-ISUP Segmented Message |
| EQ | Enquiry |
| ESRA | ECMA Standard Rate Adaptation |
| ETS | European Telecommunications Standard |
| ETSI | European Telecommunications Standards Institute |
| | |
| FAM | Final Address Message |
| FDX | Full Duplex |
| FIC | Facility Indicator Code |
| FM | Fixed Mandatory |
| FO | Fixed Optional |
| | |
| GNP | Geographic Number Portability |
| GSM | Global System for Mobile Communication |
| | |
| HDX | Half Duplex |
| HLR | Howler (message) |
| | |
| IA5 | International Alphabet No.5 |
| IAI | Incomplete Address Indicator |
| IAM | Initial Address Message |
| ICB | Incoming Calls Barred |
| ICC | Information Contained Code |
| IDA | Integrated Digital Access |
| IFAM | Initial and Final Address Message |

| | |
|---|---|
| IND | International Number Dialling |
| INIC | ISDN Network Identification Code |
| INT | International Indicator |
| IQ | Identity Qualifier |
| IRC | Information Requested Code |
| ISC | Interconnect Standards Committee |
| ISDN | Integrated Services Digital Network |
| ISI | Interconnect Specific Information |
| ISPBX | ISDN PBX |
| ISUP | ISDN User Part |
| ITU | International Telecommunications Union |
| ITU-T | International Telecommunications Union - Telecommunications Standardisation Sector |
| IUP | Interconnect User Part |
| IW | Interworking (with non C7 Signalling network/route) |
| | |
| LI | Line Identity |
| LPD | Long Propagation Delay (indicator) |
| LPR | Last Party Release (Indicator) |
| LSB | Least Significant Bit |
| | |
| MDG | Meter Delay Guard (timeout) |
| MRC | Mobile Rerouteing Code |
| MSB | Most Significant Bit |
| MSD | Message Sequence Diagram |
| MTP | Message Transfer Part |
| | |
| NAE | Network Address Extension |
| NAI | Nature of Address Indicator |
| NEED | Nodal End-to-End Data (message) |
| NGNP | Non-Geographic Number Portability |
| NICC | Network Interoperability Consultative Committee |
| NN | Network Number |
| NND | National Number Dialling |
| NNG | National Number Group |
| NNIQ | Network Number Identity Qualifier |
| NP | Network Provided |
| NPP | Number Portability Prefix |
| NTA | Network Translated Address |
| NTE | Network Terminating Equipment |
| NTP | Network Termination Point |

| OCB | Outgoing Calls Barred |
| OCM | Operator Condition Message |
| OFCOM | Office of Communications |
| OLM | Overload Message |
| ONN | OSS Node-to-Node (message) |
| OOR | Operator Override |
| OPC | Originating Point Code |
| OSS | Operator Services System |
| | |
| PA | Priority Access |
| PABX | Private Automatic Branch Exchange |
| PBX | Private Branch Exchange |
| PCLI | Partial Calling Line Identity |
| PCM | Pulse Code Modulation |
| PN | Presentation Number |
| PNI | Presentation Number Indicator |
| PNIQ | Presentation Number Identity Qualifier |
| PNM | Protocol Negotiation Message |
| PNO | Public Network Operator |
| PNO-IG | Public Network Operator Interest Group |
| PNO-ISC | Public Network Operator Interconnect Standards Committee |
| POI | Point Of Interconnect |
| PRI | Protocol Request Indicator |
| PROT | Protection Indicator |
| PSTN | Public Switched Telephone Network |
| | |
| RAM | Repeat Attempt Message |
| RAN | Re-answer (message) |
| RCI | Routeing Control Indicator |
| REC | Recipient Exchange Code |
| REL | Release (message) |
| RES | Resume (message) (user-initiated) |
| RPI | Release Protocol Indicator |
| RPOA | Recognised Private Operating Agency |
| | |
| SAD | Send All Digits (message) |
| SAM | Subsequent Address Message |
| SASUI | Send Additional Set Up Information (message) |
| SCCP | Signalling Connection Control Part |
| SCP | Service Control Point |
| SEM | Subscriber Engaged Message |

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| SER | Service (message) |
|------|------|
| SHP | Service Handling Protocol |
| SI | Screening Indicator |
| SIC | Service Indicator Code |
| SIF | Signalling Information Field |
| SIM | Service Information Message |
| SIO | Service Information Octet |
| SND | Send N Digits (message) |
| SOO | Subscriber Out-of-Order (message) |
| SSM | Send Service Message |
| SSTV | Slow Scan TeleVision |
| SUS | Suspend (message) (user-initiated) |
| SVI | Service Interception |
|  |  |
| TA | Terminal Adapter |
| TCAP | Transaction Capabilities Application Part |
| TCC | Telephone Country Code |
| TCM | Terminal Congestion Message |
| TOS | Temporarily Out-of-Service |
|  |  |
| UBA | Unblocking Acknowledgement (message) |
| UBL | Unblocking (message) |
| UK | United Kingdom of Great Britain and Northern Ireland |
| UPNV | User Provided, Not Verified |
| UPVP | User Provided, Verified and Passed |
| UUD | User-to-User Data (message) |
|  |  |
| VM | Variable Mandatory |
| VO | Variable Optional |

### 0.7.2 Terminology

The following definitions are contained in PNO-ISC/SPEC/016 /16/

calling line identity (CLI)
calling line identity presentation (CLIP) service
calling line identity restriction (CLIR) service
CLI available
CLI restricted/withheld
CLI unavailable
COL available
COL restricted/withheld
COL unavailable
connected line identity (COL)
network number (NN)
network provided (NP) number
presentation number (PN)
user provided, not verified (UPNV) number
user provided, verified and passed (UPVP) number

**Called Customer/Operator**
   The customer/operator in the Terminating Network to whom the call is directed.

**Calling Customer/Operator**
   The customer/operator in the Originating Network initiating the call.

**codespace**
   A parameter or discrete part of a parameter to which a range of values may be assigned.

**codepoint**
   A value assigned to a parameter or discrete part of a parameter.

**Donor Network**
   The initial network where a number was located before ever being ported.

**Incoming Network**
   The network to which a call is passed from a point of interconnection between two networks.

   NOTE - The incoming network may be the terminating network or a transit network.

**Informative service**
   A service for which a description has been produced by a particular supplier or operator. However, PNO-IG agreement of the description has been neither sought nor received for application of that service between networks in the UK. These services are described in the relevant sections of document /1/ for information only, there being no obligation on any Operator to support the service either internally or via interconnect routes with other Operators. The information contained in /1/ may be used as the basis of bilateral agreements between Operators.

**Intercepting Network**
   The network which traps a call prior to answer and passes it for answer to an operator in the terminating network.

**Manual hold**
   A feature that permits an answered call to be maintained in this state until the called operator releases it.

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**Originating Network**
The network to which the customer/operator who originates a call is directly connected.

**Outgoing Network**
The network from which a call is passed to a point of interconnection between two networks.

> NOTE - The outgoing network may be the originating network or a transit network.

**Ported Number**
A called number which has been relocated to another network

**Recipient Exchange Code**
A five digit code which identifies the exchange in the Recipient Network, to which the number has been ported from the Donor Network.

**Recipient Network (in the context of Number Portability)**
The network where the number is located after being ported.

**required**
Where a service/feature/message/parameter is qualified as "required" it shall be fully supported by the implementation concerned.

> Note: The term may be applied independently to an interface protocol and/or the underlying functionality.

**reserved**
Codespace and codepoints defined in this specification as "reserved" are available for use only with the agreement of the PNO-ISC.

**Service**
The term service refers to both network features and customer services.

**Standard service**
A service for which a formal description has been approved by the PNO-IG for application between networks in the UK. Where a Standard service is supported on any particular C7 IUP interconnect then that support must conform to this specification. However, there is no obligation on any Operator to support the service either internally or via interconnect routes with other Operators. PNO-ISC/SPEC/006 may be used as the basis of bilateral agreements between Operators

**Targeted Network**
The network targeted by the originating network when using the Targeted Transit Service /5/.

**Terminating Network**
The network to which the customer/operator who receives a call is directly connected.

**Third Party Network**
The network involved in carrying a 'ported' call between Donor Network and Recipient Network, but which is neither a Donor or Recipient Network.

**Transit Network**
A network through which a call passes, but which is neither the originating network nor the terminating network for that call.

NOTE - A transit network acts as an outgoing network and as an incoming network.

**END OF PNO-ISC/SPEC/006 § 0**

# 1 INTRODUCTION

## 1.0 Scope

This section provides an introduction and context to Specification PNO-ISC/SPEC/006.

## 1.1 Scope of PNO-ISC/SPEC/006

PNO-ISC/SPEC/006 specifies the signalling procedures, formats and codes that shall be used to support Standard customer services and network features at the point of interconnect between public networks in the UK using the C7 IUP protocol.

The inclusion in this specification of any service shall not imply that the service is supported on any particular interconnect, or by any particular network. The services supported on a particular interconnect shall be determined by bilateral agreement between the operators of the interconnected networks.

Each service is described at both a service and protocol level. The service overviews are provided for information only. Full service descriptions, where available, can be found within the PNO-ISC/SER series of documents.

## 1.2  Contents of PNO-ISC/SPEC/006

**Section 1,** Introduction, defines the scope and describes the structure of the C7 IUP specification.

**Section 2**, Message Types and Contents, provides a "library" of messages and parameters, and specifies their formats and codes. These are drawn upon as necessary by the services and procedures described in Sections 3 onwards. Thus, messages, parameters or codes are only required to be supported if a service which employs them is supported. Codepoints used only by informative services or procedures are marked in this section, for information only, with a '#' sign.

**Section 3**, Common Procedures, provides a "library" of common procedures. These are of two types:

Common call control procedures

These are given in Subsection 2 of Section 3 and are drawn upon as necessary to realise the services described in Sections 4 onwards. A common call control procedure need only be supported if a service that employs it is supported.

Core procedures

These are given in the other subsections of Section 3 and are applicable to all C7 IUP interconnects.

**Section 4**, Telephony Call, specifies the signalling protocol to support the Telephony Call service.

**Section 5** is spare.

**Section 6,** ISDN Call, specifies the signalling protocol to support the Basic ISDN call service.

**Sections 7 & 8** are spare.

**Section 9**, Calling Line Identification Presentation & Restriction (CLIP & CLIR), specifies the signalling protocol to support the calling line identification presentation (CLIP) and calling line identification restriction (CLIR) (incorporating calling number display) supplementary service.

**Section 10**, Number Portability, specifies the signalling protocol to support the Number Portability service for geographic, non-geographic and mobile numbers.

**Section 11**, Completion of Calls to Busy Subscriber (CCBS), specifies the signalling protocol to support the CCBS supplementary service.

**Section 12,** Targeted Transit, specifies the signalling protocol to support the Targeted Transit service.

**Sections 13, 14 & 15**, are spare.

**Section 16**, Operator Services, specifies the signalling protocol to support Operators Services.


**END OF PNO-ISC/SPEC/006 § 1**

# 2 MESSAGE TYPES AND CONTENTS

## 2.0 Scope

The purpose of this section of PNO-ISC/SPEC/006 is to provide a "library" of messages and parameters that are standardised for use across a national interconnect between two Public Network Operators. Some message and parameter codings are not standardised for use across national interconnects and their formats and codes are therefore not contained within this specification. These message and parameter formats and codes are contained in /1/, which uses corresponding subsection numbering. The use for other purposes of codes allocated to these messages and parameters is not recommended.

## 2.1 General

### 2.1.1 Message Formats

C7 IUP messages are carried on the signalling data link encapsulated in the Signalling Information Field of a MTP message signal unit, the format of which is described in /9/. The allocation of Point Codes is the subject of /6/.

A C7 IUP message consists of an integral number of octets up to a maximum of 62 or 272 (as determined by the MTP capability).

Figure 2.1 shows the format of the message presented to, or received from, the MTP.

| 2 octets | n octets | 5 octets |
|---|---|---|
| MTP check bits | <-----------Signalling information field (SIF)----------> | MTP header (includes SIO & flag) |

| <----Optional fields----> | | <--Mandatory fields---> | | <---------Header---------> | | <--40-bit standard telephony label--> | | |
|---|---|---|---|---|---|---|---|---|
| Variable length fields | Fixed length fields | Variable length fields | Fixed length fields | H1 | H0 | CIC | OPC | DPC |
| qx8 | px8 | mx8 | nx8 | 8 | 8 | 12 | 14 | 14 |
| <---------------------------------------------IUP message---------------------------------------------> | | | | | | | | |
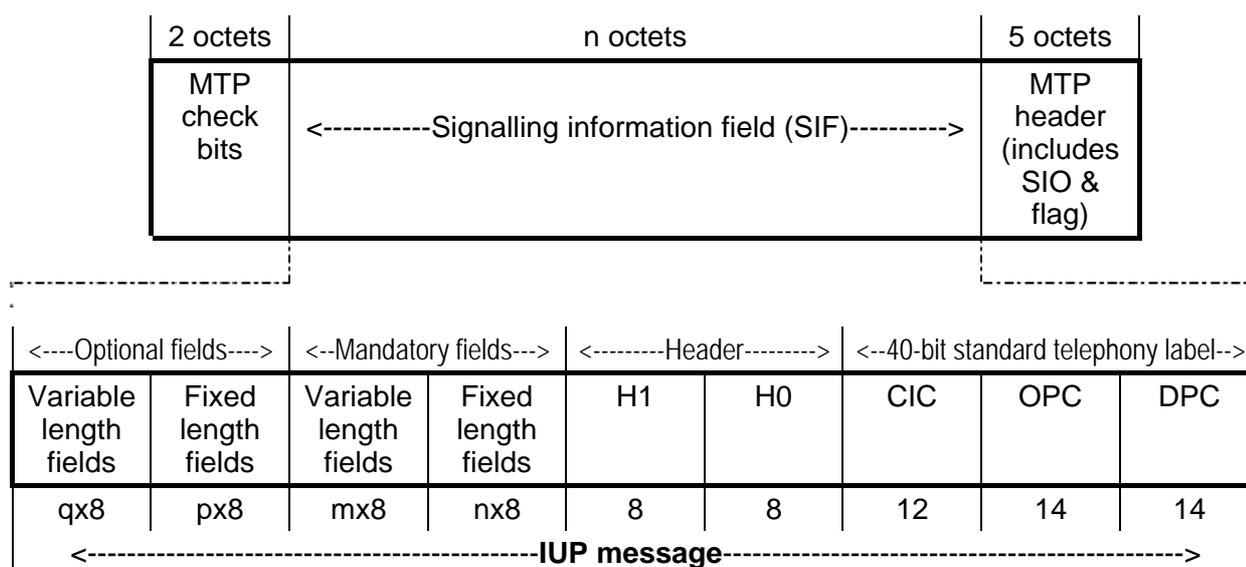
FIGURE 2.1
**Standard format of the IUP Message**

### 2.1.2 Standard Telephony Label

This consists of 40 bits and contains the originating and the destination point codes and the circuit identification code.

### 2.1.2.1 Point Codes

Every node using C7 has at least one unique point code. The Destination Point Code (DPC) is used by the MTP to route the message to the correct node. The Originating Point Code (OPC) is used by the receiving network to direct any replies to the correct node. Thus, for each C7 IUP message the DPC and OPC identifies the traffic route to which the message relates.

### 2.1.2.2 Circuit Identification Code (CIC)

The CIC uniquely identifies the particular speech circuit within the identified traffic route to which the signalling information contained in the message relates.

### 2.1.3 IUP Message Header

Each IUP signalling message contains a header consisting of two parts, Heading Code H0 and Heading Code H1. Code H0 identifies the message group while H1 identifies the name, and implicitly the format, of the message. The allocation of H0 and H1 codes is shown in Table 2.2.

### 2.1.4  Format Principles

IUP messages may contain a number of parameters as defined in 2.3. Each parameter may be of fixed length, or variable length, and the inclusion of such parameters may be mandatory or optional. These attributes are described below.

In most cases the message parameters, and their attributes, are defined by the H0/H1 code for the particular message. However, some messages are defined as having a number of different message "types". In these cases, the parameters and their attributes are specific to the message type. This is shown in 2.3.

#### 2.1.4.1  Mandatory Parameters

Mandatory parameters shall always be included when the message is sent, and shall always be expected when a message is received.

#### 2.1.4.2  Optional Parameters

Optional parameters are not always present in a message. They may be included, for example, based on information being available, or when required by the service in use.

In most cases, the presence or absence of an optional field is shown by an indicator which itself is either a mandatory parameter, or a field within a mandatory parameter. However, in some cases the overall length of the message is the only indication of presence of the parameter.

#### 2.1.4.3  Fixed Length Parameters

Fixed length parameters always contain the same number of bits, whenever they are used within the message. In addition, the format of the parameter is also fixed.

#### 2.1.4.4  Variable Length Parameters

Variable length parameters may be of any length, within the specified range. The actual length is determined by a fixed length parameter, or field within a parameter. This may be within a preceding fixed length parameter, or within the variable length parameter itself. This length may be given either as the number of octets or the number of instances of a particular type of field (e.g. number of digits).

#### 2.1.4.5  Order of Transmission

The parameters of each message shall be transmitted in the order given in the tables of 2.3. Within each parameter, the octets shall be transmitted in the order shown in the parameter descriptions (2.4), least significant bit first.

## 2.2 Message Groups and Types

### 2.2.1 Message Groups

There are eight groups of messages (0-5, 7 & 8) defined for current use. The first four (0-3) of these are used to set up a basic telephony call. The next group (4) of messages deals with the supervisory phase of the call. There is an additional group (5) to deal with the circuit supervisory functions. The seventh group (7) of messages is used to invoke ISDN services and pass additional call information across the network. The eighth group (8) of messages is used to support enveloped ISUP. The allocation of H0 and H1 codes is shown in Table 2.1.

In C7 IUP the message groupings shall be as follows:-

### 2.2.1.1 Forward Address Messages (H0=0)

Messages in this group are used to initiate a call and to forward dialled digits and call instructions between networks.

The Forward Address messages are:

> Initial Address Message (IAM)

> Initial and Final Address Message (IFAM)

> Subsequent Address Message (SAM)

> Final Address Message (FAM)

### 2.2.1.2 Forward Set-Up Messages (H0=1)

Messages in this group are used to carry additional set-up information (excluding called address digits) between networks.

The defined Forward Set-up message is:

Additional Set-up Information (ASUI) message Types 1-2

### 2.2.1.3 Backward Set-Up Request Messages (H0=2)

Messages in this group are used to request information relating to the set-up of the call from the outgoing network. The Backward Set-Up Request Messages are:

> Send "N" Digits (SND) message

> Send All Digits (SAD) message

> Send Additional Set-up Information (SASUI) message

### 2.2.1.4 Backward Set-Up Information Messages (H0=3)

Messages in this group are used to indicate specific call progress conditions between networks during the call set-up phase.

The defined Backward Set-up Information messages are:

> Address Complete Message (ACM)

> Congestion (CNG) message

> Terminal Congestion Message (TCM)

> Connection Not Admitted (CNA) message

> Repeat Attempt Message (RAM)

> Subscriber Engaged Message (SEM)

> Subscriber Out-of-Order (SOO) message

### 2.2.1.5  Call Supervision Messages (H0=4)

Messages in this group are used to supervise a call.

The Call Supervision messages are:

      Answer (ANS) message

      Clear (CLR) message

      Re-Answer (RAN) message

      Release (REL) message

      Coin and Fee Checking (CFC) message

      Operator Override (OOR) message

      Howler (HLR) message

      Extend Call Message (ECM)

### 2.2.1.6  Circuit Supervision Messages (H0=5)

Messages in this group are used to control the availability of the circuit.

The Circuit Supervision messages are:

      Circuit Free (CCF) message

      Blocking (BLO) message

      Unblocking (UBL) message

      Blocking Acknowledgement (BLA) message

      Unblocking Acknowledgement (UBA) message

      Overload Message (OLM)

### 2.2.1.7  Unallocated Group (H0=6)

### 2.2.1.8  Service Information Messages (H0=7)

Messages in this group are used to support the transfer of additional information between networks over and above that normally exchanged during bearer connection establishment.

This message group also includes a Confusion message in support of forward compatibility to reject service information requests not understood or not supported by the receiving network.

The defined Service Information messages are:

      Confusion (CFN) message

      ISDN Composite Service Information Message (SIM) Types 1-8

      Send Service Message (SSM)

      Service (SER) message

      Additional Call Information (ACI) message Types 1-7

      Swap message

      User-initiated Suspend (SUS) message

      User-initiated Resume (RES) message

### 2.2.1.9  Enveloped-ISUP Messages (H0=8)

TABLE 2.1
**Allocation of H0/H1 codes**

| H0 / H1 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 0 | INITIAL ADDRESS MESSAGE | * | * | ADDRESS COMPLETE | ANSWER | CIRCUIT FREE | * | CONFUSION | |
| 1 | INITIAL AND FINAL ADDRESS | * | * | * | CLEAR | BLOCKING | * | ISDN COMPOSITE SERVICE INFO. | # |
| 2 | SUBSEQUENT ADDRESS | * | SEND 'N' DIGITS | CONGESTION | RE-ANSWER | UNBLOCKING | * | SEND SERVICE | # |
| 3 | FINAL ADDRESS | * | SEND ALL DIGITS | TERMINAL CONGESTION | RELEASE | BLOCKING ACKNOWLEDGE | * | SERVICE | |
| 4 | | ADDITIONAL SET-UP INFO. | SEND ADDITIONAL SETUP INFO. | CONNECTION NOT ADMITTED | COIN & FEE CHECKING | UNBLOCKING ACKNOWLEDGE | * | ADDITIONAL CALL INFO. | |
| 5 | | | | REPEAT ATTEMPT | OPERATOR OVERRIDE | OVERLOAD | * | # | |
| 6 | | | | SUB ENGAGED | HOWLER | * | * | # | |
| 7 | | | | SUB OUT-OF-ORDER | EXTEND CALL | * | * | SWAP | |
| 8 | | | | * | * | * | | | |
| 9 | | | | * | * | * | | | |
| 10 | | | | # | * | * | | | |
| 11 | | | | | * | * | | # | |
| 12 | | | | | * | * | | USER-INITIATED SUSPEND | |
| 13 | | | | | * | * | | USER-INITIATED RESUME | |
| 14 | | * | | | * | * | | # | |
| 15 | | | | | | * | | | |
| 16 | | | | | | * | | | |
| 130 | | | | | | | | | # |

* - these are not available for ISC use.

# - see /1/.

All unallocated and available codings may be allocated by the PNO-ISC in the future.

## 2.2.2 Message Types

Table 2.2 lists the messages in alphabetical order. The table also includes a reference to where detailed information is contained, and the H0/H1 octets in binary code and decimal code in brackets.

TABLE 2.2
**Message types**

| Message Title | Subsection Reference | Message Group Code (H0) | Message Name Code (H1) |
|---|---|---|---|
| Additional Call Information (ACI) - Type 1 | 2.3.1.1 | 00000111 [7] | 00000100 [4] |
| Additional Call Information (ACI) - Type 2 | 2.3.1.2 | 00000111 [7] | 00000100 [4] |
| Additional Call Information (ACI) - Type 3 | 2.3.1.3 | 00000111 [7] | 00000100 [4] |
| Additional Call Information (ACI) - Type 4 | 2.3.1.4 | 00000111 [7] | 00000100 [4] |
| Additional Call Information (ACI) - Type 5 | 2.3.1.5 | 00000111 [7] | 00000100 [4] |
| Additional Call Information (ACI) - Type 6 | 2.3.1.6 | 00000111 [7] | 00000100 [4] |
| Additional Call Information (ACI) - Type 7 | 2.3.1.7 | 00000111 [7] | 00000100 [4] |
| Additional Call Information (ACI) - Type 8 | 2.3.1.8 | 00000111 [7] | 00000100 [4] |
| Additional Setup Information (ASUI) -Type 1 | 2.3.2.1 | 00000001 [1] | 00000100 [4] |
| Additional Setup Information (ASUI) -Type 2 | 2.3.2.2 | 00000001 [1] | 00000100 [4] |
| Address Complete Message (ACM) | 2.3.3 | 00000011 [3] | 00000000 [0] |
| Answer (ANS) | 2.3.4 | 00000100 [4] | 00000000 [0] |
| Blocking (BLO) | 2.3.5 | 00000101 [5] | 00000001 [1] |
| Blocking Acknowledgement (BLA) | 2.3.6 | 00000101 [5] | 00000011 [3] |
| Call Drop Back (CDB) | 2.3.7 | 00000011 [3] | 00001010 [10] |
| Circuit Free (CCF) | 2.3.8 | 00000101 [5] | 00000000 [0] |
| Clear (CLR) | 2.3.9 | 00000100 [4] | 00000001 [1] |
| Coin and Fee Checking (CFC) | 2.3.10 | 00000100 [4] | 00000100 [4] |
| Confusion (CFN) | 2.3.11 | 00000111 [7] | 00000000 [0] |
| Congestion (CNG) | 2.3.12 | 00000011 [3] | 00000010 [2] |
| Connection Not Admitted (CNA) | 2.3.13 | 00000011 [3] | 00000100 [4] |
| Enveloped ISUP Message (EIM) | 2.3.42 | 00001000 [8] | 00000010 [2] |
| Enveloped ISUP Segmented Message (EISM) | 2.3.43 | 00001000 [8] | 10000010 [130] |
| Extend Call Message (ECM) | 2.3.14 | 00000100 [4] | 00000111 [7] |
| Final Address Message (FAM) | 2.3.15 | 00000000 [0] | 00000011 [3] |
| Howler (HLR) | 2.3.16 | 00000100 [4] | 00000110 [6] |
| Initial Address Message (IAM) | 2.3.17 | 00000000 [0] | 00000000 [0] |
| Initial and Final Address Message (IFAM) | 2.3.18 | 00000000 [0] | 00000001 [1] |
| ISDN Composite Service Information Message (SIM) - Type 1 | 2.3.19.1 | 00000111 [7] | 00000001 [1] |
| ISDN Composite Service Information Message (SIM) - Type 2 | 2.3.19.2 | 00000111 [7] | 00000001 [1] |
| ISDN Composite Service Information Message (SIM) - Type 3 | 2.3.19.3 | 00000111 [7] | 00000001 [1] |
| ISDN Composite Service Information Message (SIM) - Type 4 | 2.3.19.4 | 00000111 [7] | 00000001 [1] |
| ISDN Composite Service Information Message (SIM) - Type 5 | 2.3.19.5 | 00000111 [7] | 00000001 [1] |
| ISDN Composite Service Information Message (SIM) - Type 6 | 2.3.19.6 | 00000111 [7] | 00000001 [1] |
| ISDN Composite Service Information Message (SIM) - Type 7 | 2.3.19.7 | 00000111 [7] | 00000001 [1] |
| ISDN Composite Service Information Message (SIM) - Type 8 | 2.3.19.8 | 00000111 [7] | 00000001 [1] |
| Nodal End-to-End Data (NEED) | 2.3.20 | 00000111 [7] | 00001011 [11] |
| Operator Condition Message (OCM) | 2.3.21 | 00000111 [7] | 00000101 [5] |

| Message Title | Subsection Reference | Message Group Code (H0) | Message Name Code (H1) |
|---|---|---|---|
| Operator Override (OOR) | 2.3.22 | 00000100 [4] | 00000101 [5] |
| OSS Node-to-node (ONN) message | 2.3.45 | 00000111 [7] | 00001110 [14] |
| Overload (OLM) | 2.3.23 | 00000101 [5] | 00000101 [5] |
| Protocol Negotiation Message (PNM) | 2.3.44 | 00001000 [8] | 00000001 [1] |
| Re-answer (RAN) | 2.3.24 | 00000100 [4] | 00000010 [2] |
| Release (REL) | 2.3.25 | 00000100 [4] | 00000011 [3] |
| Repeat Attempt Message (RAM) | 2.3.26 | 00000011 [3] | 00000101 [5] |
| Send Additional Set-up Information (SASUI) | 2.3.27 | 00000010 [2] | 00000100 [4] |
| Send All Digits (SAD) | 2.3.28 | 00000010 [2] | 00000011 [3] |
| Send N Digits (SND) | 2.3.29 | 00000010 [2] | 00000010 [2] |
| Send Service Message (SSM) | 2.3.30 | 00000111 [7] | 00000010 [2] |
| Service (SER) | 2.3.31 | 00000111 [7] | 00000011 [3] |
| Subscriber Engaged Message (SEM) | 2.3.32 | 00000011 [3] | 00000110 [6] |
| Subscriber Out-of-Order (SOO) | 2.3.33 | 00000011 [3] | 00000111 [7] |
| Subsequent Address Message (SAM) | 2.3.34 | 00000000 [0] | 00000010 [2] |
| Swap | 2.3.35 | 00000111 [7] | 00000111 [7] |
| Terminal Congestion Message (TCM) | 2.3.36 | 00000011 [3] | 00000011 [3] |
| Unblocking (UBL) | 2.3.37 | 00000101 [5] | 00000010 [2] |
| Unblocking Acknowledgement (UBA) | 2.3.38 | 00000101 [5] | 00000100 [4] |
| User-initiated Resume (RES) | 2.3.40 | 00000111 [7] | 00001101 [13] |
| User-initiated Suspend (SUS) | 2.3.39 | 00000111 [7] | 00001100 [12] |
| User-to User Data (UUD) | 2.3.41 | 00000111 [7] | 00000110 [6] |

## 2.3 Message Contents

This sub-section provides information on each of the IUP messages defined to support those services specified in this Issue of the Specification. Within each message description is a table that lists all the parameters contained in the message in the order in which they shall be transmitted.

The parameter "Types" are:

FM - Fixed Mandatory

VM - Variable Mandatory

FO - Fixed Optional

VO - Variable Optional

NOTE - Where a parameter is shown as reserved it shall be handled as defined in 2.4.1.2.

### 2.3.1 Additional Call Information (ACI) Message

There are several types of ACI message, all having the same H0/H1 code. Each type is defined by the Information Contained/Information Requested parameter, see 2.4.2.

#### 2.3.1.1 Additional Call Information (ACI) Message - Type 1

This message is used to send Full Calling/Called Line Identity, Last Diverting Line Identity, or Presentation Number (PN).

The message format is shown in Table 2.3.

TABLE 2.3

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0/H1 Codes) | 2.2.2 | FM | 2 |
| ACI Message - Information Contained and Information Requested | 2.4.2 | FM | 2 |
| Reserved (Note) | - | FM | 2 |
| ACI Type 1 Message Indicators | 2.4.3 | FM | 1 |
| Line Identity | 2.4.19 | VM | 1-9 |

NOTE - Use of the reserved parameter is not recommended due to historical use within the BT network.

#### 2.3.1.2 Additional Call Information (ACI) Message - Type 2

This message is used to send a Partial Called/Calling Line Identity (PCLI).

The message format is shown in Table 2.4.

TABLE 2.4

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |
| ACI Message - Information Contained and Information Requested | 2.4.2 | FM | 2 |
| Partial Calling/Called Line Identity (PCLI) | 2.4.23 | FM | 9 |

### 2.3.1.3 Additional Call Information (ACI) Message - Type 3

This message is used to send Full Calling/Called Line Identity with Calling/Called Subscriber's Basic Service Marks.

The message format is shown in Table 2.5.

TABLE 2.5

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (HO and H1 Codes) | 2.2.2 | FM | 2 |
| ACI Message - Information Contained and Information Requested | 2.4.2 | FM | 2 |
| Calling/Called Subscriber's Basic Service Marks | 2.4.11 | FM | 2 |
| ACI Type 3 Message Indicators | 2.4.4 | FM | 1 |
| Line Identity | 2.4.19 | VM | 1-9 |

### 2.3.1.4 Additional Call Information (ACI) Message - Type 4

This message is used to send Called Subscriber's Basic Service Marks.

The message format is shown in Table 2.6.

TABLE 2.6

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (HO and H1 Codes) | 2.2.2 | FM | 2 |
| ACI Message - Information Contained and Information Requested | 2.4.2 | FM | 2 |
| Calling/Called Subscriber's Basic Service Marks | 2.4.11 | FM | 2 |
| ACI Type 4 Message Indicators | 2.4.5 | FM | 1 |

### 2.3.1.5 Additional Call Information (ACI) Message - Type 5

This message is used to send Calling Subscriber's Originating Facility Marks.

The message format is shown in Table 2.7.

TABLE 2.7

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (HO and H1 Codes) | 2.2.2 | FM | 2 |
| ACI Message - Information Contained and Information Requested | 2.4.2 | FM | 2 |
| Calling Subscriber's Originating Facility Marks | 2.4.12 | FM | 2 |

### 2.3.1.6 Additional Call Information (ACI) Message - Type 6

This message is used to send Called Subscriber's Terminating Facility Marks.

The message format is shown in Table 2.8.

TABLE 2.8

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (HO and H1 Codes) | 2.2.2 | FM | 2 |
| ACI Message - Information Contained and Information Requested | 2.4.2 | FM | 2 |
| Called Subscriber's Terminating Facility Marks | 2.4.10 | FM | 2 |

### 2.3.1.7 Additional Call Information (ACI) Message - Type 7

This type of ACI is used to request additional call information.

The message format is shown in Table 2.9.

TABLE 2.9

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |
| ACI Message - Information Contained and Information Requested | 2.4.2 | FM | 2 |

### 2.3.1.8 Additional Call Information (ACI) Message - Type 8

See /1/.

### 2.3.2 Additional Set-up Information (ASUI) Message

There are two types of Additional Set-up Information Message both having the same H0/H1 code.

### 2.3.2.1 Additional Set-up Information (ASUI) Message - Type 1

This message is used to send (full) Calling Line Identity.

The message format is shown in Table 2.10.

TABLE 2.10

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |
| ASUI Message - Information Contained | 2.4.8 | FM | 1 |
| Line Identity | 2.4.19 | FM | 1-9 |

### 2.3.2.2 Additional Set-up Information (ASUI) Message - Type 2

This message is used to send Partial Calling Line Identity.

The message format is shown in Table 2.11.

TABLE 2.11

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |
| ASUI Message - Information Contained | 2.4.8 | FM | 1 |
| Reserved | - | FM | 1 |
| Partial Calling Line Identity | 2.4.23 | FM | 9 |

### 2.3.3  Address Complete Message (ACM)

This message is returned from the incoming network to indicate that all address signals required for routeing the call have been received.

The message format is shown in Table 2.12.

TABLE 2.12

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |
| Address Complete Message Indicators | 2.4.7 | FM | 3 |

### 2.3.4  Answer (ANS) Message

This message is sent by the incoming network to indicate that switch through to the destination has occurred.

The message format is shown in Table 2.13.

TABLE 2.13

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |
| Type of Answer | 2.4.30 | FM | 1 |

### 2.3.5  Blocking (BLO) Message

This message is a request to inhibit the selection of a circuit between networks.

The message format is shown in Table 2.14.

TABLE 2.14

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |

### 2.3.6 Blocking Acknowledgement (BLA) Message

This message is an acknowledgement to a Blocking message.

The message comprises only a Label and Header, and its format is shown in Table 2.14.

### 2.3.7 Call Drop Back (CDB) Message

See /1/.

### 2.3.8 Circuit Free (CCF) Message

This message indicates that the switched connection has been successfully released and the circuit is available for further use.

The message comprises only a Label and Header, and its format is shown in Table 2.14.

### 2.3.9 Clear (CLR) Message

This message indicates that the calling or called party has cleared.

The message comprises only a Label and Header, and its format is shown in Table 2.14.

### 2.3.10 Coin and Fee Checking (CFC) Message

This message provides operator control of pay-on-answer coinbox telephones.

The message comprises only a Label and Header, and its format is shown in Table 2.14.

### 2.3.11 Confusion (CFN) Message

This message is used to indicate that a Group 7 message which is not understood, or not valid, has been received, or when the receiving network cannot provide any of the information requested in that Group 7 message.

The message format is shown in Table 2.15.

TABLE 2.15

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |
| Confusion Message Qualifier | 2.4.14 | FO | 1 |

NOTE - It is recommended that a Confusion Message Qualifier is included with the Confusion message.

### 2.3.12 Congestion (CNG) Message

This message is used to indicate that the call has encountered congestion.

The message comprises only a Label and Header, and its format is shown in Table 2.14.

### 2.3.13 Connection Not Admitted (CNA) Message

This message is used to indicate that the call cannot be connected for any of the reasons listed in 2.4.15. The message format is shown in Table 2.16.

TABLE 2.16

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |
| CNA Reason | 2.4.15 | FM | 1 |
| CNA Diagnostics | 2.4.36 | FM | 1 |

### 2.3.14 Extend Call Message (ECM)

This message is used on SVI calls to enable the SVI operator to extend the call to the required customer.

The message comprises only a Label and Header, and its format is shown in Table 2.14.

### 2.3.15 Final Address Message (FAM)

This message is used in response to a request for further digits, when the digits contained within the message complete the called address.

The message format is shown in Table 2.17.

TABLE 2.17

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |
| Reserved | - | FM | 1 |
| Called Address | 2.4.9 | VM | 1-10 |

### 2.3.16 Howler (HLR) Message

This message enables a network to request application of 'howler' to a customer's line on another network.

The message comprises only a Label and Header, and its format is shown in Table 2.14.

### 2.3.17 Initial Address Message (IAM)

This message is used to initiate a call attempt.

The message format is shown in Table 2.18.

TABLE 2.18

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |
| IAM/IFAM Message Indicators | 2.4.16 | FM | 5 |
| Called Address | 2.4.9 | VM | 1-11 |
| Line Identity | 2.4.19 | VO | 1-9 |

### 2.3.18 Initial and Final Address Message (IFAM)

This message is used to initiate a call attempt when the complete called address is available.

The IFAM format is the same as the IAM format as shown in Table 2.18.

### 2.3.19 ISDN Composite Service Information Message (SIM)

This message is used to request/send ISDN-related information. There are several types of ISDN Composite SIM, all having the same H0/H1 code combination. Each type is defined by the Information Contained/Information Requested parameter, see 2.4.18.

### 2.3.19.1 ISDN Composite Service Information Message (SIM) - Type 1

The message format is shown in Table 2.19.

NOTE - This message is obsolescent and should not be used by new implementations. New implementations should use ISDN Composite SIM Type 7.

TABLE 2.19

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |
| ISDN Composite SIM - Information Contained & Information Requested | 2.4.18 | FM | 2 |

### 2.3.19.2 ISDN Composite Service Information Message (SIM) - Type 2

The message format is shown in Table 2.20.

TABLE 2.20

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |
| ISDN Composite SIM - Information Contained & Information Requested | 2.4.18 | FM | 2 |
| Facility Indicator Code | 2.4.17 | FM | 2 |
| Service Indicator Code | 2.4.27 | FM | 2 |
| Reserved | - | FM | 1 |
| Line Identity | 2.4.19 | VM | 1-9 |

### 2.3.19.3 ISDN Composite Service Information Message (SIM) - Type 3

The message format is shown in Table 2.21.

TABLE 2.21

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |
| ISDN Composite SIM - Information Contained & Information Requested | 2.4.18 | FM | 2 |
| Facility Indicator Code | 2.4.17 | FM | 2 |
| Service Indicator Code | 2.4.27 | FM | 2 |
| Closed User Group Interlock Code | 2.4.13 | FM | 4 |
| Reserved | - | FM | 1 |
| Line Identity | 2.4.19 | VM | 1-9 |

### 2.3.19.4  ISDN Composite Service Information Message (SIM) - Type 4

The message format is shown in Table 2.22.

NOTE - This message is obsolescent and should not be used by new implementations. New implementations should use ISDN Composite SIM Type 8.

TABLE 2.22

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |
| ISDN Composite SIM - Information Contained & Information Requested | 2.4.18 | FM | 2 |
| Reserved | - | FM | 1 |
| Line Identity | 2.4.19 | VM | 1-9 |

### 2.3.19.5  ISDN Composite Service Information Message (SIM) - Type 5

The message format is shown in Table 2.23.

TABLE 2.23

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |
| ISDN Composite SIM - Information Contained & Information Requested | 2.4.18 | FM | 2 |
| Facility Indicator Code | 2.4.17 | FM | 2 |
| Service Indicator Code | 2.4.27 | FM | 2 |
| Reserved | - | FM | 1 |
| Line Identity | 2.4.19 | VM | 1-9 |
| Six Character Network Address Extension | 2.4.29 | VM | 2-7 |

### 2.3.19.6  ISDN Composite Service Information Message (SIM) - Type 6

The message format is shown in Table 2.24.

TABLE 2.24

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |
| ISDN Composite SIM - Information Contained & Information Requested | 2.4.18 | FM | 2 |
| Facility Indicator Code | 2.4.17 | FM | 2 |
| Service Indicator Code | 2.4.27 | FM | 2 |
| Closed User Group Interlock Code | 2.4.13 | FM | 4 |
| Reserved | - | FM | 1 |
| Line Identity | 2.4.19 | VM | 1-9 |
| Six Character Network Address Extension | 2.4.29 | VM | 2-7 |

### 2.3.19.7  ISDN Composite Service Information Message (SIM) - Type 7

The message format is shown in Table 2.25.

TABLE 2.25

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |
| ISDN Composite SIM - Information Contained & Information Requested | 2.4.18 | FM | 2 |
| Facility Indicator Code | 2.4.17 | FM | 2 |

### 2.3.19.8  ISDN Composite Service Information Message (SIM) - Type 8

The message format is shown in Table 2.26.

TABLE 2.26

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |
| ISDN Composite SIM - Information Contained & Information Requested | 2.4.18 | FM | 2 |
| Facility Indicator Code | 2.4.17 | FM | 2 |
| Reserved | - | FM | 1 |
| Line Identity | 2.4.19 | VM | 1-9 |

### 2.3.20  Nodal End-to-End Data (NEED) Message

See /1/.

### 2.3.21  Operator Condition Message (OCM)

See /1/.

SEE PAGE 2 FOR THE NORMATIVE INFORMATION

### 2.3.22 Operator Override (OOR) Message

This message enables an operator in one network to offer an incoming call to a customer on another network who is already engaged on another call.

The message comprises only a Label and Header, and its format is shown in Table 2.14.

### 2.3.23 Overload Message (OLM)

This message is used to indicate that the call attempt has been rejected due to overload.

The message comprises only a Label and Header, and its format is shown in Table 2.14.

### 2.3.24 Re-Answer (RAN) Message

This message is sent after a clear message to indicate that a call has returned to the answered state.

The message comprises only a Label and Header, and its format is t shown in Table 2.14.

### 2.3.25 Release (REL) Message

This message may be returned from a network to cause release of a call for any of the reasons listed in 2.4.24.

The message format is shown in Table 2.27.

TABLE 2.27

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |
| Release Reason (Note) | 2.4.24 | FO | 1 |

NOTE - It is recommended that a reason parameter is included with the Release Message.

### 2.3.26 Repeat Attempt Message (RAM)

This message is used to indicate that the call has been unsuccessful and should be reattempted on the same route.

The message comprises only a Label and Header, and its format is the same as that shown in Table 2.14.

### 2.3.27 Send Additional Set-up Information (SASUI) Message

This message is used to request further information concerning call establishment.

The message format is shown in Table 2.28.

TABLE 2.28

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |
| Information Indicator | 2.4.25 | FM | 1 |

### 2.3.28  Send All Digits (SAD) Message

This message is used to request that all digits are forwarded as soon as possible, i.e. those available en bloc and the rest individually as they become available.

The message format is shown in Table 2.29.

TABLE 2.29

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |
| Reserved | - | FM | 1 |

### 2.3.29  Send N Digits (SND) Message

This message is used to request a specific number of digits to be forwarded.

The message format is shown in Table 2.30.

TABLE 2.30

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |
| Number of Digits Requested | 2.4.26 | FM | 1 |

### 2.3.30  Send Service Message (SSM)

This message is sent by the terminating network to elicit the operator service required by the originating network.

The message comprises only a Label and Header, and its format is shown in Table 2.14.

### 2.3.31  Service (SER) Message

This message is sent by the originating network to the terminating network in response to a Send Service Message, in order to identify the operator service required.

The message format is shown in Table 2.31.

TABLE 2.31

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |
| Service Code | 2.4.28 | FM | 1 |

### 2.3.32  Subscriber Engaged Message (SEM)

This message is used to indicate an unsuccessful call set-up due to the required subscriber being engaged on another call.

NOTE - The preferred means of indicating Subscriber Engaged is the CNA or Release Message equivalent with reason "Subscriber Engaged".

The message comprises only a Label and Header, and its format is shown in Table 2.14.

### 2.3.33  Subscriber Out-of-Order (SOO) Message

This message is used to indicate an unsuccessful call set-up due to the required subscribers line being temporarily out of order.

NOTE - The preferred means of indicating Subscriber Out-of-Order is the CNA or Release Message equivalent with reason "Subscriber Out-of-Order".

The message comprises only a Label and Header, and its format is shown in Table 2.14.

### 2.3.34  Subsequent Address Message (SAM)

This message is used in response to requests for further digits at call set-up.

The message format is shown in Table 2.32.

TABLE 2.32

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |
| Reserved | - | FM | 1 |
| Called Address | 2.4.9 | VM | 2-10 |

### 2.3.35  Swap Message

This message is used on ISDN calls to change between voice and data mode, or from one data mode to another.

The message format is shown in Table 2.33.

TABLE 2.33

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |
| Service Indicator Code | 2.4.27 | FM | 2 |
| Reserved | - | FM | 1 |

### 2.3.36  Terminal Congestion Message (TCM)

This message is used to indicate an unsuccessful call set-up due to congestion if re-routeing is not possible.

NOTE - The preferred means of indicating Terminal Congestion is the CNA or Release Message equivalent with reason "Congestion (Re-routeing not permitted)".

The message comprises only a Label and Header, and its format is shown in Table 2.14.

### 2.3.37  Unblocking (UBL) Message

This message is used to remove a Blocking condition.

The message comprises only a Label and Header, and its format is shown in Table 2.14.

### 2.3.38 Unblocking Acknowledgement (UBA) Message

This message is used as an acknowledgement to an Unblocking message.

The message comprises only a Label and Header, and its format is shown in Table 2.14.

### 2.3.39 User Initiated 'Suspend' (SUS) Message

This message is used to indicate that the call has been suspended by the user.

The message format is shown in Table 2.34.

TABLE 2.34

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |
| Reserved | - | FM | 1 |

### 2.3.40 User Initiated 'Resume' (RES) Message

This message is used to indicate that the suspended call has been resumed by the user.

The message format is shown in Table 2.35.

TABLE 2.35

| Parameter | Reference Subs. | Type | Length (octets) |
|---|---|---|---|
| Label | 2.1.2 | FM | 5 |
| Header - (H0 and H1 Codes) | 2.2.2 | FM | 2 |
| Reserved | - | FM | 1 |

### 2.3.41 User-to-User Data (UUD) Message

See /1/.

### 2.3.42 Enveloped-ISUP Message (EIM)

See /1/.

### 2.3.43 Enveloped-ISUP Segmented Message (EISM)

See /1/.

### 2.3.44 Protocol Negotiation Message (PNM)

See /1/.

### 2.3.45 OSS Node-to-node (ONN) Message

See /1/.

## 2.4  Parameter Formats and Code Allocations

### 2.4.1  General

#### 2.4.1.1  Parameter Titles

Table 2.36 lists the parameters in alphabetical order together with references to the subsections in which they are described.

TABLE 2.36
**Parameter titles**

| Parameter Title | Subsection Reference |
|---|---|
| Additional Call Information Message - Information Contained Code & Information Requested Code | 2.4.2 |
| Additional Call Information Message Type 1 - Message Indicators | 2.4.3 |
| Additional Call Information Message Type 3 - Message Indicators | 2.4.4 |
| Additional Call Information Message Type 4 - Message Indicators | 2.4.5 |
| Additional Call Information Message Type 8 - Message Indicators | 2.4.6 |
| Additional Set-up Information Message - Information Contained | 2.4.8 |
| Address Complete Message Indicators | 2.4.7 |
| Call Drop Back Message - Calling Line Information Indicator | 2.4.32 |
| Call Drop Back Message - Call Log Indicators | 2.4.33 |
| Call Drop Back Message - Service Control Point (SCP) Information | 2.4.34 |
| Call Drop Back Message - Translated Address | 2.4.35 |
| Called Address | 2.4.9 |
| Called Subscriber's Terminating Facility Marks | 2.4.10 |
| Calling/Called Subscriber's Basic Service Marks | 2.4.11 |
| Calling Subscriber's Originating Facility Marks | 2.4.12 |
| Closed User Group (CUG) Interlock Code | 2.4.13 |
| Confusion Message Qualifier | 2.4.14 |
| Connection Not Admitted - Diagnostics | 2.4.36 |
| Connection Not Admitted - Reason | 2.4.15 |
| EISM Segmentation Information | 2.4.38 |
| IAM/IFAM Message Indicators | 2.4.16 |
| ISDN Composite SIM - Facility Indicator Code | 2.4.17 |
| ISDN Composite SIM - Information Contained and Information Requested | 2.4.18 |
| ISUP Message | 2.4.37 |
| ISUP Message Segment | 2.4.39 |
| Line Identity (LI) | 2.4.19 |
| Nodal End-to-End Data | 2.4.21 |
| Nodal End-to-End Data Message - Content Qualifier | 2.4.20 |
| Operator Condition Indicators | 2.4.22 |
| Partial Calling Line Identity (PCLI) | 2.4.23 |
| Protocol Negotiation Message Indicators | 2.4.40 |
| Release Reason | 2.4.24 |
| Send Additional Set-Up Information Message - Information Indicator | 2.4.25 |
| Send N Digits Message - Number of Digits Requested | 2.4.26 |
| Service Indicator Code (SIC) | 2.4.27 |
| Service Message - Service Code | 2.4.28 |
| Six Character Network Address Extension (Sub-Address) | 2.4.29 |
| Type of Answer | 2.4.30 |
| User-to-User Data | 2.4.31 |

## 2.4.1.2  Reserved Parameter Fields

Some of the parameter fields within the parameters detailed in this sub-section are shown as "reserved". No significance shall be attached to the value of the bits within reserved parameter

fields (but see Section 3 for transit operation). Some of these fields are reserved for current use outside the scope of this specification. Others are reserved for future ISC use and must not be assigned a meaning without endorsement by the ISC. However, the ISC may endorse the use and meaning of a parameter field prior to it appearing in an issued ISC Specification.

### 2.4.1.3 Reserved Values within Parameter Fields

Some of the parameter field values detailed in this sub-section are shown as "reserved". Some of these values are reserved for current use outside the scope of this specification. Others are reserved for future ISC use and must not be assigned a meaning without endorsement by the ISC. However, the ISC may endorse the use and meaning of a parameter field value prior to it appearing in an issued ISC Specification.

### 2.4.2 Additional Call Information Message Information Contained Code and Information Requested Code

The format of the ACI Message Information Contained/Information Requested parameter field is shown in Figure 2.2.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|
| INFORMATION CONTAINED CODE (ICC) | | | | | | | |
| INFORMATION REQUESTED CODE (IRC) | | | | | | | |
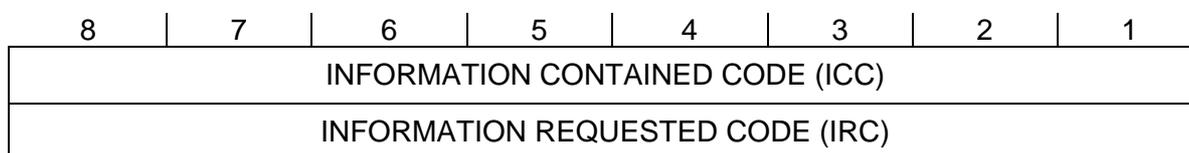
FIGURE 2.2
**ACI Message Information Contained Code / Information Requested Code parameter**

The Information Contained Code indicates the contents of an ACI message. The Information Requested Code indicates the information being requested by an ACI message. The ICC and IRC code meanings shall be common to both fields, and are as follows:

| | |
|---|---|
| 00000000 [0] | No information |
| 00000001 [1] | Full Calling Line Identity |
| 00000010 [2] | Full Called Line Identity |
| 00000011 [3] | Partial Calling Line Identity |
| 00000100 [4] | Partial Called Line Identity |
| 00000101 [5] | Full Calling Line Identity with Calling Subscriber's Basic Service Marks |
| 00000110 [6] | Full Called Line Identity with Called Subscriber's Basic Service Marks |
| 00000111 [7] | Called Subscriber's Basic Service Marks |
| 00001000 [8] | Calling Subscriber's Originating Facility Marks |
| 00001001 [9] | Called Subscriber's Terminating Facility Marks |
| 00001010 [10] | see /1/ |
| 00001011 [11] | Last Diverting Line Identity |
| 00001100 [12] | Presentation Number Line Identification |
| 00001101 [13] | ) |
| to | ) reserved |
| 11111111 [255] | ) |

Each combination of ICC and IRC defines an ACI Message Type. The format of each type is different and these are detailed in 2.3.1.

Table 2.37 lists the allowed ICC and IRC combinations for ACI Types 1 to 7.

TABLE 2.37
**ACI Message Types 1 to 7 - Information Contained/Information Requested**

| Additional Call Information Message Type | Permitted Information Contained Codes | Permitted Information Requested Codes |
|---|---|---|
| ACI Type 1 | 00000001 [1]<br>00000010 [2]<br>00001011 [11]<br>00001100 [12] | 00000000 [0] |
| ACI Type 2 | 00000011 [3]<br>00000100 [4] | 00000000 [0] |
| ACI Type 3 | 00000101 [5]<br>00000110 [6] | 00000000 [0] |
| ACI Type 4 | 00000111 [7] | 00000000 [0] |
| ACI Type 5 | 00001000 [8] | 00000000 [0] |
| ACI Type 6 | 00001001 [9] | 00000000 [0] |
| ACI Type 7 | 00000000 [0] | 00000001 [1]<br>00000010 [2]<br>00000101 [5]<br>00000110 [6]<br>00000111 [7]<br>00001000 [8]<br>00001001 [9]<br>00001011 [11]<br>00001100 [12] |

### 2.4.3  Additional Call Information Message Type 1 - Message Indicators

The format of the ACI, Type 1 Message Indicators parameter is shown in Figure 2.3.

| | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|---|
| 1 | OPERATOR INDICATOR | reserved (Note) | | | | | | |
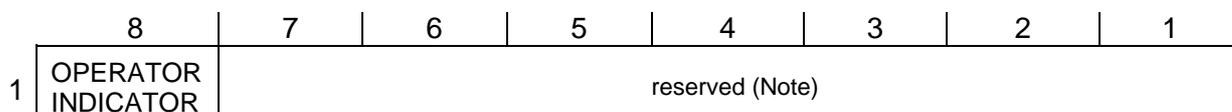
NOTE - Use of Bits 1-7 is not recommended due to historical use within the BT network.

FIGURE 2.3
**ACI Message Type 1 - Message Indicators parameter**

The following codes are defined for use in the fields of the ACI Message Type 1 - Message Indicators parameter.

**Operator Indicator**

0    No information

1    Operator involved in call set-up

### 2.4.4  Additional Call Information Message Type 3 - Message Indicators

The format of the ACI, Type 3 Message Indicators parameter shown in Figure 2.4.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|
| OPERATOR INDICATOR | reserved | CALLING/CALLED SUBSCRIBER'S TARIFF GROUP | | | | | |

(row label: 1)
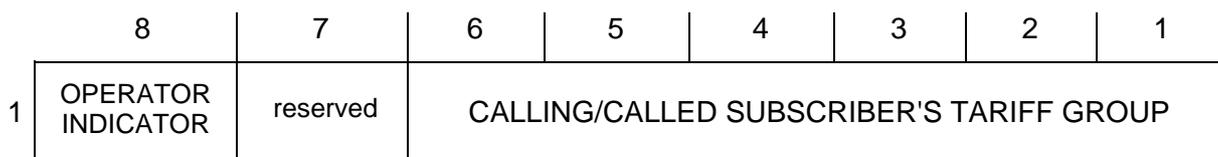
FIGURE 2.4
**ACI Message Type 3 - Message Indicators parameter**

The following codes are defined for use in the fields of the ACI Message Type 3 - Message Indicators parameter.

**a) Calling/ Called Subscriber's Tariff Group**

000000 )     Code allocations are network specific only, but meanings may be mutually
to       )     agreed between the PNOs concerned. This Specification does not specify
111111 )     the codings.

The contents of this field shall be ignored by the receiving network if no bilateral agreement exists between the PNOs concerned.

**b) Operator Indicator**

0         No information

1         Operator involved in call set-up

### 2.4.5 Additional Call Information Message Type 4 - Message Indicators

The format of the ACI, Type 4 Message Indicators parameter field is shown in Figure 2.5.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|
| Reserved | | CALLED SUBSCRIBER'S TARIFF GROUP | | | | | |

(row label: 1)
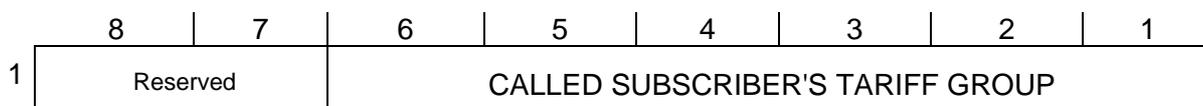
FIGURE 2.5
**ACI Message Type 4 - Message Indicators parameter**

The following codes are defined for use in the sub-fields of the ACI Message Type 4 - Message Indicators parameter field.

**Called Subscriber's Tariff Group**

000000 )     Code allocations are network specific only, but meanings may be mutually
to       )     agreed between the PNOs concerned. This Specification does not specify the
111111 )     codings.

The contents of this field shall be ignored by the receiving network if no bilateral agreement exists between the PNOs concerned.

### 2.4.6 Additional Call Information Message Type 8 - Message Indicators

See /1/.

### 2.4.7 Address Complete Message Indicators

The format of the Address Complete message Indicators parameter is shown in Figure 2.6.

| | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|---|
| 1 | Reserved | | CALLED PARTY CATEGORY | | | | | |
| 2 | reserved | CHARGE INDICATOR | reserved | | | | | |
| 3 | reserved | ECHO CONTROL DEVICE INDICATOR | INTERWORKING INDICATORS | | | | | LAST PARTY RELEASE INDICATOR |

FIGURE 2.6
**Address Complete Message Indicators parameter**

The following codes are defined for use in the fields of the Address Complete Message Indicators parameter.

**a) Called Party Category (CdPC)**

Providing information on the classification of the called line, (if available).

|  |  |
|---|---|
| 000000 [0] | Unknown |
| 000001 [1] | Ordinary (Residential) |
| 000010 [2] | Ordinary (Business) |
| 000011 [3] | Payphone (General) |
| 000100 [4] | Administration Diverted Ordinary |
| 000101 [5] | Administration Diverted Payphone |
| 000110 [6] | ISDN (Residential) |
| 000111 [7] | ISDN (Business) |
| 001000 [8] | Pre-payment Payphone (Public) |
| 001001 [9] | Pre-payment Payphone (Renter's Residential) |
| 001010 [10] | Pre-payment Payphone (Renter's, Business) |
| 001011 [11] | Service Line |
| 001100 [12] | Centrex |
| 001101 [13] | Operator Services Operator |
| 001110 [14] | AMC Operator (NND/IND) |
| 001111 [15] | AMC Operator (NND) |
| 010000 [16] | DPNSS 1 |
| 010001 [17] | ) |
| to | ) reserved |
| 111111 [63] | ) |

**b) Charge Indicator**

   0    No charge

   1    Charge

**c) Last Party Release (LPR) Indicator**

To indicate that last party release is to be used on the call.

   0    Invoke normal (calling party) release

   1    Invoke Last Party Release

#### d) Interworking Indicators

Indicating the nature of signalling system and transmission path that has been encountered within the interconnected networks.

| | |
|---|---|
| 00000 [0] | Analogue interworking encountered within the PSTN or call encounters an analogue or digital signalling system of lesser capability than C7 IUP, i.e. Group 7 messages are not supported (see 2.2.1.8). |
| 00001 [1] | Fully digital internodal transmission path available with message based signalling of equivalent capability to C7 IUP, connecting a digitally-connected customer/PBX. |
| 00010 [2] | Fully digital internodal transmission path available with message based signalling of equivalent capability to C7 IUP, connecting an analogue-connected customer/PBX. |
| 00011 [3]<br>to<br>01111 [15] | )<br>) reserved<br>) |
| 10000 [16] | reserved |
| 10001 [17] | Fully digital internodal transmission path available with C7(IUP) signalling (or equivalent), accessing a digital private network. |
| 10010 [18] | Fully digital internodal transmission path available with C7(IUP) signalling (or equivalent), accessing a digital private network; analogue part of private network encountered, (early backward transmission path requested). |
| 10011 [19]<br>to<br>11111 [31] | )<br>) reserved<br>) |

#### e) Echo Control Device Indicator

Indicating whether an 'incoming half echo canceller' device has been included in the backward transmission path of the connection. Refer also to 2.4.16 where the complementary IAM/IFAM forward indication is described.

| | |
|---|---|
| 0 | Incoming half echo control device not included |
| 1 | Incoming half echo control device included |

### 2.4.8 Additional Set-up Information Message Information Contained

The format of the ASUI Message Information Contained parameter is shown in Figure 2.7.

| | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|---|
| 1 | | | | INFORMATION | CONTAINED | | | |
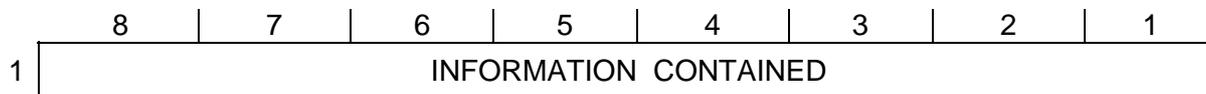
FIGURE 2.7
**ASUI Message - Information Contained parameter**

The content and hence the Type of each ASUI message shall be determined by the binary code held within the 8 bit "Information Contained" field.

The following codes are defined for use in the fields of the ASUI Message - Information Contained parameter:

00000000 [0]        reserved

00000001 [1]        Full Calling Line Identity - (ASUI Type 1 Message)

00000010 [2]        Partial Calling Line identity - (ASUI Type 2 Message)

00000011 [3]        )
to                  ) reserved
11111111[255]       )

### 2.4.9 Called Address

The format of the Called Address parameter is shown in Figure 2.8.

| | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|---|
| 1 | PRI (Note) | | | NUMBER OF CALLED ADDRESS SIGNALS | | | | |
| 2 | 2nd ADDRESS SIGNAL | | | | 1st ADDRESS SIGNAL | | | |
| : | | | | | | | | |
| m | FILLER (IF NECESSARY) | | | | nth ADDRESS SIGNAL | | | |
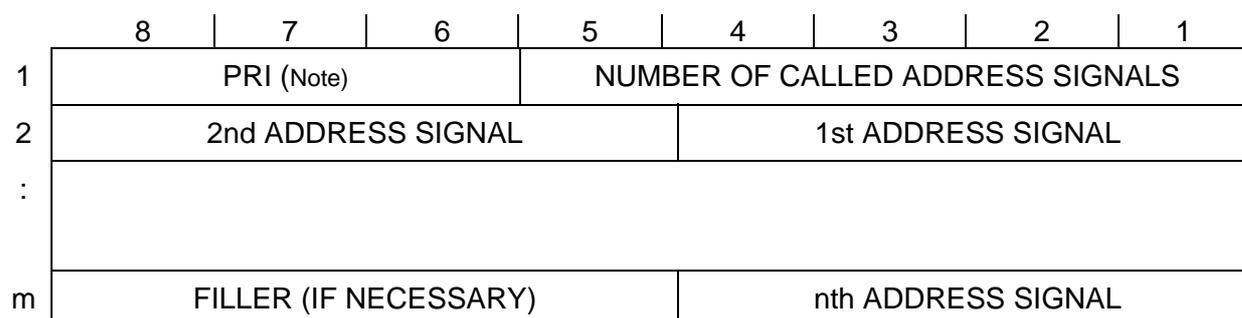
NOTE - See/1/.

FIGURE 2.8
**Called Address parameter**

The following codes are defined for use in the fields of the Called Address parameter.

### a) Number of Called Address Signals

Set to provide a binary indication of the number of Address Signals contained within the Called Address.

00000 [0]         No address signals included

00001 [1]         )
to                ) Number of address signals
10100 [20]        )

10101 [21]        )
to                ) Invalid length indication
11111 [31]        )

NOTE 1 - The IAM/IFAM can carry a maximum of 20 digits.

NOTE 2 - The SAM/FAM can carry a maximum of 18 digits, hence within these messages, codes '10011' and '10100' shall be considered as invalid length codes.

**b) Address Signals**

| | |
|---|---|
| 0000 [0] | Digit 0 |
| 0001 [1] | Digit 1 |
| 0010 [2] | Digit 2 |
| 0011 [3] | Digit 3 |
| 0100 [4] | Digit 4 |
| 0101 [5] | Digit 5 |
| 0110 [6] | Digit 6 |
| 0111 [7] | Digit 7 |
| 1000 [8] | Digit 8 |
| 1001 [9] | Digit 9 |
| 1010 [10] | reserved |
| 1011 [11] | Code 11 |
| 1100 [12] | Code 12 |
| 1101 [13] | reserved |
| 1110 [14] | reserved |
| 1111 [15] | reserved |

The most significant Address Signal shall be sent first. Subsequent Address Signals shall be sent in successive four bit fields. The order of bit transmission for each digit shall be least significant bit first.

**c) Filler**

In the case of an odd number of Address Signals, the Filler code '0000' shall be inserted after the last Address Signal, thus ensuring that the variable length parameter containing the Called Address, always contains an integral number of octets.

**2.4.10 Called Subscriber's Terminating Facility Marks**

The format of the Called Subscriber's Terminating Facility Marks parameter field is shown in Figure 2.9.

| | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|---|
| 1 | H | G | F | E | D | C | B | A |
| 2 | P | O | N | M | L | K | J | I |

FIGURE 2.9
**Called Subscriber's Terminating Facility Marks parameter field**

The following codes are defined for use in the sub-fields of the Called Subscriber's Terminating Facility Marks parameter field.

**A - SVI Indicator**

> 0   no information
>
> 1   SVI active

**B - CNI Indicator**

> 0   no information
>
> 1   CNI active

**C - PBX Night Interception Indicator**

    0    no information

    1    PBX Night Interception active

**D - Call Waiting Indicator**

    0    no information

    1    Call Waiting active

**E - Fixed Destination Service Indicator**

    0    no information

    1    Fixed Destination Service active

**F to P - reserved.**

### 2.4.11  Calling/Called Subscriber's Basic Service Marks

The format of the Calling/Called Subscriber's Basic Service Marks parameter is shown in Figure 2.10.

| | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|---|
| 1 | H | G | F | E | D | C | B | A |
| 2 | P | O | N | M | L | K | J | I |

FIGURE 2.10
**Calling/Called Subscriber's Basic Service Marks parameter**

The following codes are defined for use in the fields of the Calling/Called Subscriber's Basic Service Marks parameter.

**A - Admin./Maintenance Call Barring Indicator**

    0    no information

    1    Incoming admin./maintenance calls barred (i.e. OOR or monitor barred)

**B - Subscriber Controlled Incoming Calls Barred Indicator**

    0    no information

    1    Subscriber controlled ICB active

**C - Pre-arranged Incoming Calls Barred Indicator**

    0    no information

    1    Pre-arranged ICB active

**D - Permanent Incoming Calls Barred Indicator**

    0    no information

    1    Permanent ICB active

**E - Temporary Out-of-Service (TOS) Indicator**

    0    no information

    1    TOS active

**F - ICB, Except for Operator, Indicator**

    0     no information

    1     ICB except for Operator calls active

**G - Called Subscriber Facility Information Indicator**

    0     no information

    1     Called Subscriber Facility Information available

**H - Calling Subscriber Facility Information Indicator**

    0     no information

    1     Calling Subscriber Facility Information available

**I - Permanent Outgoing Calls Barred Indicator**

    0     no information

    1     Permanent OCB active

**J - Outgoing Local Calls Barred Indicator**

    0     no information

    1     Outgoing Local Calls barred

**K - Outgoing National Calls Barred Indicator**

    0     no information

    1     Outgoing National Calls barred

**L - Outgoing International Calls Barred Indicator**

    0     no information

    1     Outgoing International Calls barred

**M - Operator Calls Barred Indicator**

    0     no information

    1     Calls to Operators barred

**N - Supplementary Facility Calls Barred Indicator**

    0     no information

    1     Supplementary facility calls barred, (except for removal of barring)

**O - Digit Masking Indicator**

    0     no information

    1     Digit masking required

**P - Calls to Premium-phones Barred Indicator**

    0     no information

    1     Calls to Premium-phones barred

### 2.4.12 Calling Subscriber's Originating Facility Marks

The format of the Calling Subscriber's Originating Facility Marks parameter field is shown in Figure 2.11.

| | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|---|
| 1 | H | G | F | E | D | C | B | A |
| 2 | P | O | N | M | L | K | J | I |

FIGURE 2.11
**Calling Subscriber's Originating Facility Marks parameter field**

The following codes are defined for use in the sub-fields of the Calling Subscriber's Originating Facility Marks parameter field.

**A - Disabled Subscriber Indicator**

   0   no information

   1   Disabled Subscriber

**B - Attended Call Office Indicator**

   0   no information

   1   reserved for Attended Call Office (booth working)

**C - Advice of Duration and Charge (AD&C) Indicator**

   0   no information

   1   AD&C required

**D - PBX Subscriber Indicator**

   0   no information

   1   PBX Subscriber

**E to P - reserved.**

### 2.4.13 Closed User Group (CUG) Interlock Code

The format of the Closed User Group Interlock Code parameter field is shown in Figure 2.12.

| | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|---|
| | (PART A - DNIC   or Interim INIC) | | | | | | | |
| 1 | D2 | | | | D1 | | | |
| 2 | D4 | | | | D3 | | | |
| 3 | ( PART   B ) | | | | | | | |
| 4 | ------------ BINARY   CODE ------------- | | | | | | | |

FIGURE 2.12

**Closed User Group Interlock Code parameter field**

The following codes are defined for use in the sub-fields of the Closed User Group Interlock Code parameter field.

**a) Part A - Data Network Identification Code (DNIC)/Interim ISDN Network Identification Code (Interim INIC)**

Part A shall consist of four BCD decimal digits, (D1 to D4), expressing the Data Network Identification Code (DNIC), or the Interim ISDN Network Identification Code (Interim INIC) of the country or network of the co-ordinating administration.

In general the coding of the BCD digits in Part A of the CUG Interlock Code shall follow the same rules as for other IUP BCD digit fields. Each digit is formed by a 4 bit sub-field, binary coded to represent the digits 0 to 9. The most significant digit (D1) of the sub-field (or part of a sub-field) is sent to line first and the least significant digit (D4) is sent last.

The least significant bit of each digit is sent to line first, the most significant bit last.

The following positional codings shall apply for the BCD digits:-

   **i) Data Network CUGs - (Initial BCD Digit Value "2" to "7")**
   Part A of the Interlock Code, in this case known as the DNIC, shall be coded as follows:

   The Data Country Code (DCC), which is always 3 digits in length with an initial digit value of "2" to "7", shall be carried in the digit positions D1 to D3. The most significant digit in position D1 and the least significant digit in position D3. Position D4 carries the extra (network) digit.

   e.g. For a DCC of "234" followed by the network digit "2", the order of transmission is:- 2432-------> to line.

   **ii) ISDN CUGs - (Initial BCD Digit Value "9" or "0")**
   Part A of the Interlock Code, now known as the Interim INIC, shall be coded as follows:

   The initial digit, value "9" or "0", shall be included in the D1 position and the E.164 telephone country code (TCC) carried in positions D2 to D4. The most significant digit of the TCC shall be carried in position D2 and the least significant digit in position D4. For one and two digit country codes, digit positions D3 and D4 may include filler code(s) (0000) or RPOA/network identification digit(s), coded and positioned in accordance with the above rules.

   Examples:

   UK (TCC = 44)   -  order of transmission: 0449------> to line

   Finland (TCC = 358)  -  order of transmission: 8530------> to line.

**b) Part B  - Binary Code**

Part B shall consist of a 16 bit pure binary representation of the decimal number of the international CUG number, i.e. 00000 to 65,535.

The 16 bit Part B of the Interlock Code shall be sent to line least significant bit first and most significant bit last. Bit 1 of Octet 3 is the least significant bit and Bit 8 of Octet 4 is the most significant bit.

Further information on CUG interlock codes and CUG administration may be found in ITU-T Recommendations E.167 and X.180.

**2.4.14  Confusion Message Qualifier**

The format of the Confusion Message Qualifier parameter is shown in Figure 2.13.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|
| 1 | | | QUALIFIER | | | | |

FIGURE 2.13
**Confusion Message Qualifier parameter**

The following code is defined for use in the Confusion Message Qualifier parameter.

| | |
|---|---|
| 00000000 [0] | no information |
| 00000001 [1] | ) |
| to | ) reserved |
| 11111111 [255] | ) |

### 2.4.15  Connection Not Admitted (CNA) - Reason

The format of the Connection Not Admitted - Reason parameter is shown in Figure 2.14.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|
| 1 | | | CNA - REASON | | | | |
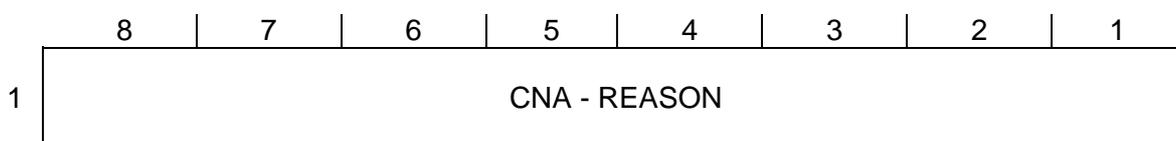
FIGURE 2.14
**Connection Not Admitted - Reason parameter**

The following codes are defined for use in the CNA Reason parameter field.

| | |
|---|---|
| 00000000 [0] | Number Unobtainable |
| 00000001 [1] | Address Incomplete |
| 00000010 [2] | Network Termination |
| 00000011 [3] | Service Unavailable |
| 00000100 [4] | Subscriber Incompatible |
| 00000101 [5] | Subscriber Transferred |
| 00000110 [6] | reserved - used by access signalling systems only |
| 00000111 [7] | Congestion, rerouteing not permitted |
| 00001000 [8] | Subscriber Engaged |
| 00001001 [9] | Subscriber Out-of-Order |
| 00001010 [10] | Subscriber Controlled Incoming Calls Barred |
| 00001011 [11] | reserved - used by access signalling systems only |
| 00001100 [12] | Network Protective Controls |
| 00001101 [13] | Rejected Diverted Calls |
| 00001110 [14] | Selective Call Barring |
| 00001111 [15] | Reserved - used by Release message only |
| 00010000 [16] | Reserved - used by Release message only |
| 00010001 [17] | Reserved - used by Release message only |
| 00010010 [18] | Remote Procedure Error |
| 00010011 [19] | Service Incompatible |
| 00010100 [20] | reserved |
| 00010101 [21] | reserved - used by access signalling systems only |
| 00010110 [22] | reserved |
| 00010111 [23] | reserved |
| 00011000 [24] | Facility Not Registered |
| 00011001 [25] | reserved |
| 00011010 [26] | reserved - used by access signalling systems only |
| 00011011 [27] | reserved |

00011100 [28]    reserved
00011101 [29]    reserved
00011110 [30]    Network Address Extension Error
00011111 [31]    reserved - used by Release message only
00100000 [32]    reserved - used by Release message only
00100001 [33]    Temporary Out-of-Service
00100010 [34]    Protocol Violation
00100011 [35]    reserved
00100100 [36]    Operator Priority Access
00100101 [37]    reserved
00100110 [38]    reserved
00100111 [39]    reserved
00101000 [40]    reserved
00101001 [41]    CUG Access Barred
00101010 [42]    reserved
00101011 [43]    reserved
00101100 [44]    reserved
00101101 [45]    DTE Controlled Not Ready
00101110 [46]    DTE Uncontrolled Not Ready
00101111 [47]    reserved - used by Release message only
00110000 [48]    Subscriber Call Termination
00110001 [49]    reserved
00110010 [50]    reserved - used by access signalling systems only
00110011 [51]    reserved - used by access signalling systems only
00110100 [52]    reserved
00110101 [53]    Flow Controlled
00110110 [54]    Out of Catchment Area
00110111 [55]    Translation Out-of-Service
00111000 [56]    Permanent Incoming Calls Barred
00111001 [57]    Spare Number/Spare Code
00111010 [58]    Anonymous Call Rejection
00111011 [59]    )
to               ) reserved
01111111 [127]   )

10000000 [128]   )
to               ) reserved - available for intra-network use only
11111111 [255]   )

CNA Reason values are defined below.

**[0] Number Unobtainable**
Indicating that the destination, determined by the received address digits, is unavailable, eg. the address digits included an address digit outside the range 0-9.

**[1] Address Incomplete**
Indicating that insufficient digits or selection information have been received.

**[2] Network Termination**
Indicating that the call has been cleared down due to either forced release by the administration, hardware failure or any other reason for which there is not a specific CNA Reason.

**[3] Service Unavailable**
Indicating that the requested service cannot be provided, eg. the received IAM/IFAM contains unrecognised CPI and/or SHP values.

**[4] Subscriber Incompatible**
Indicating that the required line is not capable of receiving the service that is being offered, for example an ISDN Cat. 1 call to an analogue customer.

NOTE - A basic telephony call to an ISDN customer is considered compatible since a telephony call is considered to be a facility of the ISDN service. If the called ISDN customer does not support telephony calls, the call will be failed with reason Service Incompatible. The difference between Subscriber Incompatible and Service Incompatible may be summarised as the terminating exchange generates Subscriber Incompatible while the customer's Network Terminating Equipment (NTE) generates Service Incompatible.

**[5] Subscriber Transferred**
Indicating that the required line is connected to Changed Number Interception Service. This is returned on ISDN Category 1 (data) call attempts only, indicating that a telephony call is necessary to gain access to the CNI operator.

**[7] Congestion, rerouteing not permitted**
Indicating unsuccessful call set-up due to congestion within the network when rerouteing is not permitted, e.g. congestion at the terminating network.

**[8] Subscriber Engaged**
Indicating that the required subscriber is engaged or that routes to a PBX are busy.

**[9] Subscriber Out-of-Order**
Indicating that, due to a fault condition, the required subscriber is temporarily out of order or the terminating equipment is isolated.

**[10] Subscriber Controlled Incoming Calls Barred**
Indicating that the required line cannot receive incoming calls at this time as a result of the Subscriber Controlled Incoming Calls Barred facility being active.

**[12] Network Protective Controls**
Indicating that the call cannot be set up due to network management constraints, e.g. Call Gapping; no rerouteing is permitted.

**[13] Rejected Diverted Calls**
Indicating that the required subscriber is not accepting diverted calls.

**[14] Selective Call Barring**
Indicating that the called subscriber is not accepting calls from this calling subscriber, e.g. the calling subscriber is not one of the nominated numbers held by the network for selective call barring.

**[18] Remote Procedure Error**
Indicating procedural error at the terminating network.

**[19] Service Incompatible**
Indicating that the service requested is not supported by the called customer, for example, a telephony or Category 1 ISDN voice/data call made to an ISDN customer whose NTE is not equipped with a telephone.

**[24] Facility Not Registered**
Indicating that the network, having received a call request relating to a service requiring prior activation, has no knowledge of prior activation, e.g. the facility had not been registered.

**[30] Network Address Extension Error**
Indicating that a PBX has received insufficient or incorrect NAE information when this service is invoked on call set-up.

**[33] Temporary Out-of-Service**
Indicating that the required customer's line is not in service as a result of administrative action or at the request of the customer.

**[34] Protocol Violation**
Indicating that the call cannot be set-up due to a violation which warrants immediate release of the call.

**[36] Operator Priority Access**
Indicating that the call attempt is being released due to a priority call.

**[41] CUG Access Barred**
Indicating, on ISDN calls, that access to a specified closed user group is barred.

**[45] DTE Controlled Not Ready**
Indicating on ISDN calls that the terminal equipment, although operational, is temporarily unable to accept incoming calls.

**[46] DTE Uncontrolled Not ready**
Indicating, on ISDN calls, that the terminal equipment is unable to enter operational phases, according to the appropriate service generally because of abnormal operating conditions (e.g. mains failure at NTE).

**[48] Subscriber Call Termination**
Indicating that the called ISDN terminal has terminated the call.

**[53] Flow Controlled**
Indicating that the call has been rejected due to anticipated congestion of the customer's access circuits.

**[54] Out of Catchment Area**
Indicating that access to the destination address as given in the IAM/IFAM is dependent on the caller's catchment area (normally based on CLI) and that for this call, the caller was in a disallowed catchment area.

**[55] Translation Out-of-Service**
Indicating that call rejection has occurred as there is, temporarily, no active translation for the called address.

**[56] Permanent Incoming Calls Barred**
Indicating that the required customer's line is barred from receiving incoming calls.

**[57] Spare Number/Spare Code**
Indicating that the number or NNG code called is not allocated.

**[58] Anonymous Call Rejection**
Indicating that the called customer is not accepting calls from customers who withhold their numbers from display to the called party.

### 2.4.16  IAM/IFAM Message Indicators

The format of the IAM/IFAM Message Indicators parameter field is shown in Figure 2.15.

| | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|---|
| 1 | Reserved | Reserved | CALLING PARTY CATEGORY   (CPC) | | | | | |
| 2 | - - - - - - M E S S A G E    I N D I C A T O R S - - - - - - - - | | | | | | | |
| | H | G | F | E | D | C | B | A |
| | PROT | MDG | Reserved | PA | IW | INT | CBI | CLI |
| 3 | - - M E S S A G E    I N D I C A T O R S - - | | | | | | | |
| | L | K | J | I | SERVICE HANDLING PROTOCOL (SHP) | | | |
| | CTI | LPD | Reserved | RPI | | | | |
| 4 | INTERCONNECT SPECIFIC INFORMATION (ISI) | | | | - M E S S A G E    I N D I C A T O R S - - | | | |
| | | | | | P | O | N | M |
| | | | | | NTA | ECD | CTI | |
| 5 | PNI | CALL PATH INDICATOR (CPI) | | | ROUTEING CONTROL INDICATOR (RCI) | | | |

FIGURE 2.15
**IAM/IFAM Message Indicators parameter**

The following codes are defined for use in the fields of the IAM/IFAM Message Indicators parameter.

**a)  Calling Party Category (CPC)**

Providing information on the classification of the calling line (if available). Set by the outgoing network.

| | |
|---|---|
| 000000 [0] | Unknown |
| 000001 [1] | Ordinary (Residential) |
| 000010 [2] | Ordinary (Business) |
| 000011 [3] | Payphone (General) |
| 000100 [4] | Administration Diverted Ordinary |
| 000101 [5] | Administration Diverted Payphone |
| 000110 [6] | ISDN (Residential) |
| 000111 [7] | ISDN (Business) |
| 001000 [8] | Pre-payment Payphone (Public) |
| 001001 [9] | Pre-payment Payphone (Renter's Residential) |
| 001010 [10] | Pre-payment Payphone (Renter's, Business) |
| 001011 [11] | Service Line |
| 001100 [12] | Centrex |
| 001101 [13] | Operator Services Operator |
| 001110 [14] | AMC Operator (NND/IND) |
| 001111 [15] | AMC Operator (NND) |
| 010000 [16] | DPNSS 1 |
| 010001 [17] | ) |
| to | ) reserved |
| 100000 [32] | ) |
| 100001 [33] | French |
| 100010 [34] | English |
| 100011 [35] | German |
| 100100 [36] | Russian |

100101 [37]      Spanish
100110 [38]      reserved for other ITU languages
100111 [39]      reserved for other ITU languages
101000 [40]      reserved for other ITU languages
101001 [41]      )
 to              ) reserved
111111 [63]      )

**b)  Octet 1 Bits 7 and 8**

      reserved

**c)  Message Indicators A to H**

Further sub-divided as follows.

### i)  A - Calling Line Identity (CLI) Indicator
Indicating whether or not the Line Identity parameter (carrying a CLI) is included as an optional field in the IAM/IFAM.

    0   Calling Line Identity (CLI) not included

    1   Calling Line Identity (CLI) included

### ii)  B - CLI Blocking Indicator (CBI)
Indicating  whether the Network Number may be disclosed to the called user.

    0   Network Number may not be disclosed to the called user.

    1   Network Number may (subject to interaction with CLIR) be disclosed to the called user.

### iii)  C - International Indicator (INT)
Indicating whether the call has originated via the international network.

    0   No further information on call origin

    1   Call incoming via international network

### iv)  D - Interworking (IW) Indicator
The Interworking Indicator indicates whether the call has originated in, or traversed part of, a public network which has not been enhanced to support common channel signalling of equivalent capability to C7 IUP.

On a diverted call the leg after the diverting node is considered to be a separate call, hence the interworking indicator shall be set according to the signalling protocols appropriate to that leg of the call.

    0   No interworking involved

    1   Interworking involved

### v)  E - Priority Access Indicator (PA)
Indicating that a call may, under congestion conditions, cause Forced Release of another call which is non priority and non protection marked (see viii) below). The freed circuit is then used by the Priority Access call.

    0   Not a Priority Access call

    1   Priority Access call

### vi)  F - reserved

### vii)  G - Meter Delay Guard Timeout Indicator (MDG)
Used to indicate whether or not the terminating network should validate the answer condition before sending an Answer message.

The originating network does not require the terminating network to validate the answer condition if it also validates the Answer. This is the case if the intra-network signalling for the call includes an analogue link.

> 0   No MDG timeout required
>
> 1   MDG timeout required

### viii)  H - Protection Indicator (PROT)

Indicating whether the call should be allowed to progress if it encounters overload conditions and that, once established, should not be Force Released by a Priority Access call (see v) above).

> 0   Non-priority, non-protected call
>
> 1   Priority and protected call

PROT may be set to 1, for example on the following call types:-

> i)    Priority Access calls
>
> ii)   Emergency (999) calls to an operator
>
> iii)  Fire Telephones

## d)  Service Handling Protocol (SHP)

Indicating, on a per call basis, the end-to-end message protocols requested.

| | |
|---|---|
| 0000 [0] | Invoke Basic (telephony) call protocol |
| 0001 [1] | Invoke ISDN call protocol |
| 0010 [2] | Invoke Request Service protocol |
| 0011 [3] | see /1/ |
| 0100 [4] | see /1/ |
| 0101 [5] | Reserved |
| 0110 [6] | Reserved |
| 0111 [7] | Reserved |
| 1000 [8] | see /1/ |
| 1001 [9] | ) |
| to | ) reserved |
| 1111 [15] | ) |

## e)  Message Indicators I to P

Further sub-divided as follows.

### i) I - Release Protocol Indicator (RPI)

This indicator informs an incoming network that the outgoing network has the ability to receive and act correctly on any of the types of call failure message (see Section 3).

> 0   Only CNA message (or discrete message equivalents) supported to initiate release under call failure conditions in the pre-ACM call state.
>
> 1   Any type of call failure message supported to initiate call release under call failure conditions, including Release with Reason in the pre-ACM call state.

### ii)  J - reserved

### iii)  K - Long Propagation Delay Indicator - (LPD)

Indicates whether a long propagation circuit has been selected in the call routeing.

> 0   Long propagation delay path not included

    1    Long propagation delay path included, e.g. satellite path

### iv) NML - Call Type Indicator - (CTI)

Indicates mutually exclusive call types associated with supplementary and other networked services, (e.g. a call that has been diverted; this indicator shall be set on the basis of information passed from the diverting node and consequently is dependent on the capability of the intra-network signalling system; if no information is available the outgoing network shall set the indicator to 000).

    000 [0]        No information on call type

    001 [1]        "Diverted" call

    010 [2]        see /1/

    011 [3]        see /1/

    100 [4]        see /1/

    101 [5]        see /1/

    110 [6]        see /1/

    111 [7]        CCSS call

### v) O - Echo Control Device Indicator- (ECD)

Indicating whether an "outgoing half echo canceller" device has been included in the forward transmission path of the connection. Refer also to 2.4.7e) above where the complementary backward indication within the Address Complete message is described.

    0   Outgoing half echo control device not included

    1   Outgoing half echo control device included

### vi) P - Network Translated Address (NTA) Indicator

Indicating that the original called address has been translated within the network, i.e. the called address is not the number that has been dialled by the calling customer.

    0   No information

    1   Network translation of the called address has occurred

## f) Interconnect Specific Information - (ISI)

This field may be used to convey information between networks interconnected by C7 IUP. Under these circumstances, the use, codings, and meaning of the field, shall be mutually agreed between the PNOs concerned. This Specification does not specify the codings.

## g) Routeing Control Indicator - (RCI)

The specific use for this Indicator is subject to bilateral agreement. Enables the outgoing network to indicate to the incoming network preferred routeing control options.

## h) Call Path Indicator - (CPI)

Indicating the types of transmission and signalling paths required. This indicator may also include implicit information regarding the connection whilst the call path is maintained, e.g. whether or not OOR or monitor access is permitted.

000 [0]   Select any available route.  The network shall ensure that a 64 kbit/s transmission path with common channel signalling is selected in preference to a non-common channel signalling route.

001 [1]   64 kbit/s path with common channel signalling essential. OOR and monitor access shall be inhibited.

010 [2]   3.1 kHz audio bearer service required.  Specifically the speech path for this call should avoid any speech processing equipment which may adversely affect voiceband data, eg. ADPCM equipment.

011 [3]   )
to        ) reserved
111 [7]   )

## i)  Presentation Number Indicator - (PNI)

Indicating the availability of a Presentation Number (PN) for display purposes.

  0   PN not available

  1   PN available

## 2.4.17  ISDN Composite SIM - Facility Indicator Code (FIC)

The format of the ISDN Composite SIM Facility Indicator Code parameter field is shown if Figure 2.16.

| | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|---|
| 1 | ----------- | | | FACILITY | INDICATOR CODE | | | (lsb) ---------- |
| 2 | (msb) | | | | | | | |
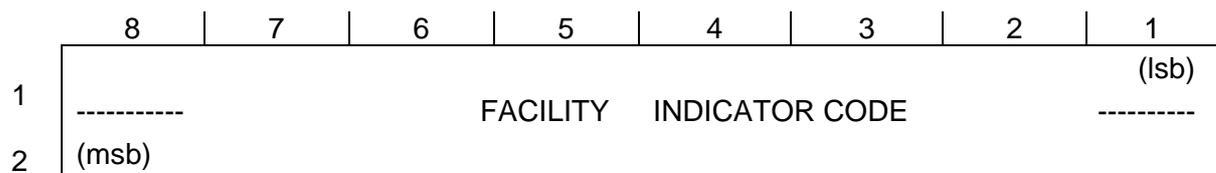
FIGURE 2.16
**ISDN Composite SIM Facility Indicator Code parameter field**

The following codes are used in the ISDN Composite SIM Facility Indicator Code parameter field to provide supplementary service information.

(msb)           (lsb)
00000000 00000000 [0]      No information
00000000 00000001 [1]      reserved
00000000 00000010 [2]      CUG with Outgoing Access
00000000 00000011 [3]      User-to-User Data Service available
00000000 00000100 [4]      User-to-User Data Service available and data following
00000000 00000101 [5]      CUG with Outgoing Access + User-to-User Data Service available
00000000 00000110 [6]      CUG with Outgoing Access + User-to-User Data Service available and data following
00000000 00000111 [7]      )
          to               ) reserved
11111111 11111111 [65535]  )

Table 2.38 indicates the permitted Facility Indicator Code values that shall be included in ISDN Composite SIM Types for the message to be valid.

TABLE 2.38
**ISDN Composite SIM Types - Facility Indicator Code Allocations**

| ISDN Composite SIM Type | Permitted FIC Codes |
|---|---|
| ISDN SIM - Type 2 | 00000000 00000000  [0]<br>00000000 00000011  [3]<br>00000000 00000100  [4] |
| ISDN SIM - Type 3 | 00000000 00000000  [0]<br>00000000 00000010  [2]<br>00000000 00000011  [3]<br>00000000 00000100  [4]<br>00000000 00000101  [5]<br>00000000 00000110  [6] |
| ISDN SIM - Type 5 | 00000000 00000000  [0]<br>00000000 00000011  [3]<br>00000000 00000100  [4] |
| ISDN SIM - Type 6 | 00000000 00000000  [0]<br>00000000 00000010  [2]<br>00000000 00000011  [3]<br>00000000 00000100  [4]<br>00000000 00000101  [5]<br>00000000 00000110  [6] |
| ISDN SIM - Type 7 | 00000000 00000000  [0]<br>00000000 00000011  [3] |
| ISDN SIM - Type 8 | 00000000 00000000  [0]<br>00000000 00000011  [3]<br>00000000 00000100  [4] |

## 2.4.18  ISDN Composite SIM - Information Contained and Information Requested

The format of the ISDN Composite SIM - Information Contained/ Information Requested parameter field is shown in Figure 2.17.

| | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|---|
| 1 | INFORMATION CONTAINED | | | | | | | |
| 2 | INFORMATION REQUESTED | | | | | | | |
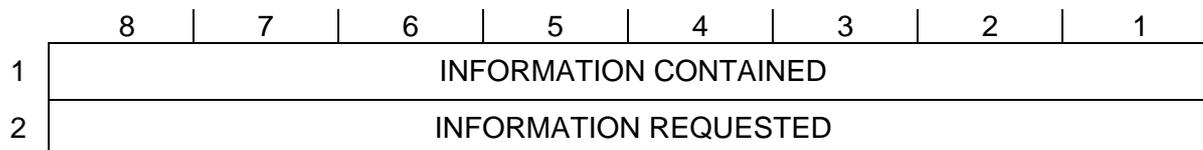
FIGURE 2.17
**ISDN Composite SIM - Information Contained/Information Requested parameter field**

The "Information Contained" and "Information Requested" code meanings shall be common to both sub-fields.  The following codes are defined for use within the ISDN Composite SIM Information Contained and Information Requested parameter sub-fields.

| | |
|---|---|
| 00000000 [0] | No information |
| 00000001 [1] | Called Line Identity |
| 00000010 [2] | Facility Indicator Code<br>Service Indicator Code<br>CUG Interlock Code<br>Calling Line Identity |
| 00000011 [3] | Facility Indicator Code<br>Service Indicator Code<br>Calling Line Identity |
| 00000100 [4] | Facility Indicator Code<br>Service Indicator Code<br>CUG Interlock Code<br>Calling Line Identity<br>6 Character Network Address Extension |
| 00000101 [5] | Facility Indicator Code<br>Calling Line Identity<br>Service Indicator Code<br>6 Character Network Address Extension |
| 00000110 [6] | Facility Indicator Code |
| 00000111 [7] | Facility Indicator Code<br>Called Line Identity |
| 00001000 [8]<br>to<br>11111111 [255] | )<br>) reserved<br>) |

Table 2.39 indicates the permitted Information Contained Codes and Information Requested Codes which shall be included in ISDN Composite SIM Types 1 to 8. For an ISDN Composite SIM to be valid an allowed combination of a single Information Contained code and a single Information Requested code, as indicated in Table 2.39, must be received.

TABLE 2.39
**ISDN Composite SIM Types - Information Contained/Information Requested Code Allocations**

| ISDN Composite SIM Type | Permitted Information Contained Codes | Permitted Information Requested Codes |
|---|---|---|
| ISDN SIM - Type 1 (Note 1) | 00000000 [0] | 00000011 [3] |
| ISDN SIM - Type 2 | 00000011 [3] | 00000001 [1] (Note 2) or 00000111 [7] |
| ISDN SIM - Type 3 | 00000010 [2] | 00000001 [1] (Note 2) or 00000111 [7] |
| ISDN SIM - Type 4 (Note 1) | 00000001 [1] | 00000000 [0] |
| ISDN SIM - Type 5 | 00000101 [5] | 00000111 [7] |
| ISDN SIM - Type 6 | 00000100 [4] | 00000111 [7] |
| ISDN SIM - Type 7 | 00000110 [6] | 00000011 [3] or 00000101 [5] |
| ISDN SIM - Type 8 | 00000111 [7] | 00000000 [0] |

NOTE 1 - SIM Types 1 and 4 are obsolescent.

NOTE 2 - IRC value [1] is obsolescent.

For the purposes of description elsewhere in this specification, the SIMs are classified as:

- SIM-A representing the first backward SIM

- SIM-B representing the forward SIM

- SIM-C representing the final backward SIM.

The specific SIM Types that are used are dependent on individual services, and are given in the appropriate sections of this specification.

SIM-A shall be a SIM Type 7

SIM-B shall be a SIM Type 2, 3, 5 or 6

SIM-C shall be a SIM Type 8.

### 2.4.19  Line identity (LI)

The Line Identity parameter is used to convey Line Identity information depending on the message that contains it. The type of Line Identity e.g. Calling/Last Diverting is indicated elsewhere in the message containing this parameter, except in the IAM/IFAM where it is always implicitly Calling Line Identity.

The format of the Line Identity parameter is shown in Figure 2.18.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|
| | | | | - - - - - - - - - MESSAGE INDICATORS - - - - - - - - - | | | |
| 1 NUMBER OF ADDRESS SIGNALS | | | | D | C | B | A |
| | | | | IQ | IAI | NAI | |
| 2 2nd ADDRESS SIGNAL | | | | 1st ADDRESS SIGNAL | | | |
| | | | | | | | |
| m FILLER (IF NECESSARY) | | | | nth ADDRESS SIGNAL | | | |

FIGURE 2.18
**Line Identity parameter**

The following codes are defined for use in the Line Identity parameter fields.

### a) Message Indicators

Further sub-divided as follows.

### BA - Nature of Address Indicator (NAI)

00 Default Value - used only when no Line Identity is present, otherwise treat as reserved.

01 reserved

10 National (significant) number, i.e. customers number omitting national prefix digit "0".

11 International number (E.164) (Note 1)

Note 1: Some implementations do not recognise BA = 11, and consequently treat it as a reserved value. In these implementations, international numbers are identified by setting bits BA = 10 and adding a leading zero to the address signals parameter field.

### C - Incomplete Address Indicator (IAI)

0 Complete address

1 Incomplete Address in Address digit field

### D - Identity Qualifier (IQ)

0 Line Identity may be released to terminal for display purposes

1 Line Identity must not be released to terminal for display purposes

### b) Number of Address Signals

Set to provide a binary indication of the number of Line Identity Address Signals contained within the Address sub-field, i.e. 0 - 15, including the Hex 'B' Address Separator Indicator if this is included, (refer to c) below).

```
0000 [0]    No Address Signals included
0001 [1]    )
to          ) Number of Address Signals
1111 [15]   )
```

**c) Address Signals**

     0000 [0]   Digit 0
     0001 [1]   Digit 1
     0010 [2]   Digit 2
     0011 [3]   Digit 3
     0100 [4]   Digit 4
     0101 [5]   Digit 5
     0110 [6]   Digit 6
     0111 [7]   Digit 7
     1000 [8]   Digit 8
     1001 [9]   Digit 9
     1010 [10]  reserved
     1011 [11]  (Hex B) Address Separator Indicator (Note)
     1100 [12]  )
      to         ) reserved
     1111 [15]  )

The most significant Address Signal shall be sent first. Subsequent Address Signals shall be sent in successive four bit sub-fields. The order of bit transmission for each digit shall be least significant bit first.

NOTE - The Address Separator Indicator, when applicable, is included to separate that part of the Line Identity which is network provided from that part which is user provided (e.g. the extension digits from a DDI PBX). The network provided part shall precede the separator.

**d) Filler**

In the case of an odd number of Address Signals, the Filler code '0000' shall be inserted after the last Address Signal, thus ensuring that the variable length parameter containing Line Identity, always contains an integral number of octets.

### 2.4.20 Nodal End-to End Data Message - Content Qualifier

See /1/.

### 2.4.21 Nodal End-to End Data

See /1/.

### 2.4.22 Operator Condition Indicators

See /1/.

### 2.4.23 Partial Calling Line Identity (PCLI)

The use, coding and meaning of some of the fields of the PCLI parameter are specified to enable each switch in the UK network to be uniquely identified. The meaning of the remaining fields must be mutually agreed between the PNOs concerned.

The format of the Partial Calling Line Identity parameter is shown in Figure 2.19.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|
| | | | TYPE OF SWITCH (BCD) | | | | |
| 1 | | D2 (units digit) | | | | D1 (tens digit) | |
| | | | PNO IDENTITY (BCD) | | | | |
| 2 | | D2 (tens digit) | | | | D1 (hundreds digit) | |
| | | SWITCH NUMBER (BCD) | | | PNO IDENTITY (BCD) | | |
| 3 | | D1 (hundreds digit) | | | | D3 (units digit) | |
| | | | SWITCH NUMBER (BCD) | | | | |
| 4 | | D3 (units digit) | | | | D2 (tens digit) | |
| 5 | | | For bilateral agreement | | | | |
| 6 | | | For bilateral agreement | | | | |
| 7 | | | For bilateral agreement | | | | |
| 8 | | | For bilateral agreement | | | | |
| 9 | | | For bilateral agreement | | | | |

FIGURE 2.19
**Partial Calling Line Identity parameter**

NOTE - The coding of Octet 1 is optional. Octets 2 to 4 are used to determine the PNO network identity together with the switch number. The contents of Octets 5 to 9 shall be bilaterally agreed. Codes for use in Octets 1 to 4 are the subject of /2/.

The following codes are defined for use in the fields of the Partial Calling Line Identity parameter field:

a) Type of switch        The use of a value other
00 - 99    BCD coded        than 00 is optional

b) PNO Identity        )
000 - 999   BCD coded   )
                                    ) PNO Switch Identity
c) Switch Number        )
000 - 999   BCD coded   )

### 2.4.24  Release - Reason

The format of the Release - Reason parameter is shown in Figure 2.20.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|
| 1 | | | RELEASE REASON | | | | |

FIGURE 2.20
**Release Reason parameter**

The validity of Release Reasons depends upon the RPI setting in the IAM/IFAM (see Annex 2.B, Table 2.B1).

The following codes are defined for use in the Release Reason parameter field.

00000000 [0]  Number Unobtainable
00000001 [1]  Address Incomplete
00000010 [2]  Network Termination

00000011 [3]  Service Unavailable

00000100 [4]  Subscriber Incompatible

00000101 [5]  Subscriber Transferred

00000110 [6]  reserved - used by access signalling systems only

00000111 [7]  Congestion, rerouteing not permitted

00001000 [8]  Subscriber Engaged

00001001 [9]  Subscriber Out-of-Order

00001010 [10]  Subscriber Controlled Incoming Calls Barred

00001011 [11]  reserved - used by access signalling systems only

00001100 [12]  Network Protective Controls

00001101 [13]  Rejected Diverted Calls

00001110 [14]  Selective Call Barring

00001111 [15]  Congestion (rerouteing not permitted) - telephony only  )

00010000 [16]  Subscriber Engaged - telephony only                      ) Note

00010001 [17]  Subscriber Out-of-Order - telephony only               )

00010010 [18]  Remote Procedure Error

00010011 [19]  Service Incompatible

00010100 [20]  reserved

00010101 [21]  reserved - used by access signalling systems only

00010110 [22]  reserved

00010111 [23]  reserved

00011000 [24]  Facility Not Registered

00011001 [25]  reserved

00011010 [26]  reserved - used by access signalling systems only

00011011 [27]  reserved

00011100 [28]  reserved

00011101 [29]  reserved

00011110 [30]  Network Address Extension Error

00011111 [31]  No Reply

00100000 [32]  Service Termination

00100001 [33]  Temporary Out-of-Service

00100010 [34]  Protocol Violation

00100011 [35]  reserved

00100100 [36]  Operator Priority Access

00100101 [37]  reserved

00100110 [38]  reserved

00100111 [39]  reserved

00101000 [40]  reserved

00101001 [41]  CUG Access Barred

00101010 [42]  reserved

00101011 [43]  reserved

00101100 [44]  reserved

00101101 [45]  DTE Controlled Not Ready

00101110 [46]  DTE Uncontrolled Not Ready

00101111 [47]  Null

00110000 [48]  Subscriber Call Termination

00110001 [49]  reserved

00110010 [50]  reserved - used by access signalling systems only

00110011 [51]  reserved - used by access signalling systems only
00110100 [52]  reserved
00110101 [53]  Flow Controlled
00110110 [54]  Out of Catchment Area
00110111 [55]  Translation Out-of-Service
00111000 [56]  Permanent Incoming Calls Barred
00111001 [57]  Spare Number/Spare Code
00111010 [58]  Anonymous Call Rejection
00111011 [59]  )
    to        ) reserved
01111111 [127] )

10000000 [128] )
    to        ) reserved - available for intra-network use only
11111111 [255] )

NOTE - The preferred method of signalling these release reasons is to use Codes 7, 8 and 9, which can be used for ISDN and telephony calls; however, Codes 15, 16 and17 are still valid.

Release Reason values are described below.

**[0] Number Unobtainable**
Indicating that the destination, determined by the received address digits, is unavailable, e.g. the address digits included an address digit outside the range 0-9.

**[1] Address Incomplete**
Indicating that insufficient digits or selection information have been received.

**[2] Network Termination**
Indicating that the call has been cleared down by the network as a result of a fault, maintenance action or when the network controls release of part of a call or connection.

**[3] Service Unavailable**
Indicating that the requested service cannot be provided, e.g. the received IAM/IFAM contains reserved CPI and/or SHP values.

**[4] Subscriber Incompatible**
Indicating that the required subscriber is not capable of receiving the service that is being offered, (e.g. an ISDN Cat.1 call to an analogue customer).

**[5] Subscriber Transferred**
Indicating that the required line is connected to Changed Number Interception Service. This is returned on ISDN Category 1 (data) call attempts only, indicating that a telephony call is necessary to gain access to the CNI operator.

**[7] Congestion, rerouteing not permitted**
Indicating an unsuccessful call set-up due to congestion within the network when rerouteing is not permitted, e.g. congestion at the terminating network.

**[8] Subscriber Engaged**
Indicating that the required subscriber is engaged or routes to a PBX are busy.

**[9] Subscriber Out-of-Order**
Indicating that, due to a fault condition, the required subscriber is temporarily out of order or isolated.

**[10] Subscriber Controlled Incoming Calls Barred**
Indicating that the required line cannot receive incoming calls at this time as a result of the Subscriber Controlled Incoming Calls Barred facility being active.

**[12] Network Protective Controls**
Indicating that the call cannot be set-up due to network management constraints, e.g. Call Gapping; rerouteing is not permitted.

**[13] Rejected Diverted Calls**
Indicating that the required subscriber is not accepting diverted calls.

**[14] Selective Call Barring**
Indicating that the called subscriber is not accepting calls from this calling subscriber, e.g. the calling subscriber is not one of the nominated numbers held by the network for selective call barring.

**[15] Congestion, rerouteing not permitted (discrete message equivalent)**
Indicating unsuccessful call set-up due to congestion within the network when rerouteing is not possible.

NOTE - This is an obsolescent code, preferred equivalent is Code 07.

**[16] Subscriber Engaged (discrete message equivalent)**
Indicating that the required subscriber is engaged or routes to a PBX are busy.

NOTE - This is an obsolescent code, preferred equivalent is Code 08.

**[17] Subscriber Out-of-Order (discrete message equivalent)**
Indicating that due to a fault condition the required subscriber is temporarily out of order.

NOTE - This is an obsolescent code, preferred equivalent is Code 09.

**[18] Remote Procedure Error**
Indicating procedural error at the terminating network.

**[19] Service Incompatible**
Indicating, on ISDN Category 1 (data) calls, that the terminating NTE is not equipped for the requested service, (also used if a telephony call or an ISDN digital voice/data call is requested to a terminating NTE which is not equipped with a telephone).

**[24] Facility Not Registered**
Indicating that a network, having received a call request relating to a service requiring prior activation, has no knowledge of prior activation, i.e. the facility had not been registered.

**[30] NAE (Network Address Extension) Error**
Indicating that an ISPBX has received insufficient or incorrect NAE information when this service is invoked on call set-up.

**[31] No Reply**
Indicating that either:

   i)   the terminating network is releasing the call as the called subscriber has not answered and no forward release has been received, i.e. the terminating CSA timeout TO-05 has matured, or

   ii)  that the originating network is releasing the call because no answer message has been received, i.e. the originating CSA timeout TO-02 has matured.

**[32] Service Termination**
Indicating that the called service has terminated the call having not received a forward release, e.g. on expiry of the announcement timeout for a Recorded Information Service.

**[33] Temporary Out-of-Service - (TOS)**
Indicating that the required customer's line is not in service as a result of administrative action or at the request of the customer.

**[34] Protocol Violation**
Indicating that a violation has been detected which warrants immediate release of the call connection.

**[36] Operator Priority Access**
Indicating that the call is being released due to a priority call.

**[41] CUG Access Barred**
Indicating, on ISDN calls, that access to a specified closed user group is barred.

**[45] DTE Controlled Not Ready**
Indicating on ISDN calls that the terminal equipment, although operational, is temporarily unable to accept incoming calls.

**[46] DTE Uncontrolled Not Ready**
Indicating, on ISDN calls, that the terminal equipment is unable to enter operational phases, according to the appropriate service generally because of abnormal operating conditions, e.g. mains failure at NTE.

**[47] Null**
Indicating that the Release Reason is either unknown or has previously been received, e.g.:

    i)    In response to a Release message (in either direction on a bothway circuit or a backward release on a unidirectional circuit); or

    ii)   In response to any of the following backward set up information messages; Congestion, Terminal Congestion, CNA, Repeat Attempt, Subscriber Engaged, Subscriber Out-of-Order.

**[48] Subscriber Call Termination**
Indicating that the subscriber has terminated the call, e.g.:

    i)    On a 3-way/call waiting service where an immediate release switching order has been given;

    ii)   When the calling/called subscriber clears subject to clearing programme and CSH timeouts (TO-01 & TO-03).

**[53] Flow Controlled**
Indicating that the call has been rejected due to anticipated congestion of the customer's access circuits.

**[54] Out of Catchment Area**
Indicating that access to the destination address as given in the IAM/IFAM is dependent on the caller's catchment area (normally based on CLI) and that for this call, the caller was in a disallowed catchment area.

**[55] Translation Out-of-Service**
Indicating that call rejection has occurred as there is, temporarily no active translation for the called address.

**[56] Permanent Incoming Calls Barred**
Indicating that the required customer's line is barred from receiving incoming calls.

**[57] Spare Number/Spare Code**
Indicating that the number or NNG code called is not recognised.

**[58] Anonymous Call Rejection**
Indicating that the called customer is not accepting calls from customers who withhold their numbers from display to the called party.

### 2.4.25  Send Additional Set-Up Information Message - Information Indicator

The format of the SASUI Message Information Indicator parameter is shown in Figure 2.21.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

1    INFORMATION INDICATOR
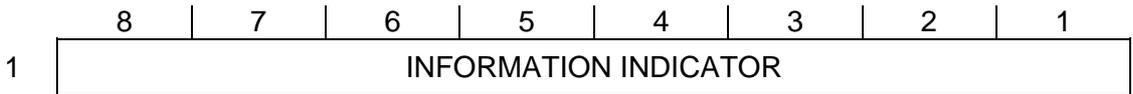
FIGURE 2.21
**SASUI Message - Information Indicator parameter**

The following codes are defined for use in the SASUI Message - Information Indicator parameter.

    00000000 [0]     reserved
    00000001 [1]     Send Calling Line Identity
    00000010 [2]     reserved
    00000011 [3]     )
    to              ) reserved
    11111111 [255]  )

## 2.4.26 'Send N Digits' Message - Number of Digits Requested

The format of the 'Send N Digits' Message - Number of Digits Requested parameter is shown in Figure 2.22.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|
| reserved | | | | NUMBER OF DIGITS REQUESTED | | | |
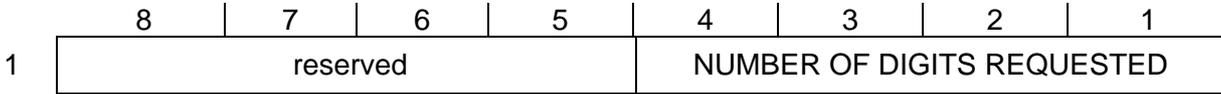
FIGURE 2.22
**'Send N Digits' Message - Number of Digits Requested parameter**

The following codes are defined for use in the 'Send N Digits' Message Number of Digits Requested parameter.

    0000 [0]     reserved
    0001 [1]     )
    to         ) Binary coded value of number of digits requested
    1111 [15]   )

## 2.4.27 Service Indicator Code (SIC)

The format of the Service Indicator Code parameter field is shown in Figure 2.23.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|
| SERVICE INDICATOR CODE | | | | | | | |
| 1st octet | | | | | | | |
| 2nd octet | | | | | | | |
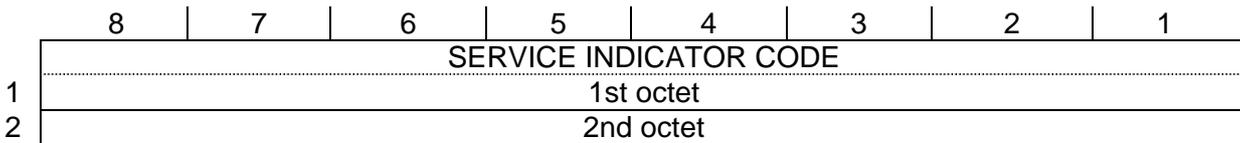
FIGURE 2.23
**Service Indicator Code parameter field**

The Service Indicator Code (SIC) indicates the type of call being requested by the calling customer, and is used by the originating network to identify the bearer required for the call. Service Indicator Code (SIC) allocations are given in Annex 2.A. When only a single octet Service Indicator Code applies then the 2nd octet shall be coded "00000000". The SIC included in the Swap message indicates the mode to which the terminal initiating the procedure wishes to swap.

## 2.4.28 'Service' Message - Service Code

The format of the 'Service' Message - Service Code parameter is shown in Figure 2.24.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|
| 'SERVICE' MESSAGE - SERVICE CODE | | | | | | | |

FIGURE 2.24
**'Service' Message - Service Code parameter**

The following codes are defined for use in the Service Message - Service Code parameter.

```
00000000  [0]     reserved
00000001  [1]     Operator Override
00000010  [2]     Service Interception
00000011  [3]     Changed Number Interception
00000100  [4]     PBX night interception
00000101  [5]     Trunk subscriber
00000110  [6]     Emergency trunk subscriber
00000111  [7]     Fire telephone
00001000  [8]     Distant operator assistance
00001001  [9]     Distant EQ
00001010  [10]    Distant DQ
00001011  [11]         )
to                     ) reserved
11111111  [255]        )
```

### 2.4.29  Six Character Network Address Extension (NAE) - (Sub-Address)

The format of the Six Character NAE parameter field is shown in Figure 2.25.

| | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|---|
| 1 | NAE CHARACTER COUNT | | | | | | | |
| 2 | 1st NAE CHARACTER | | | | | | | |
| : | | | | | | | | |
| n+1 | nth NAE CHARACTER | | | | | | | |
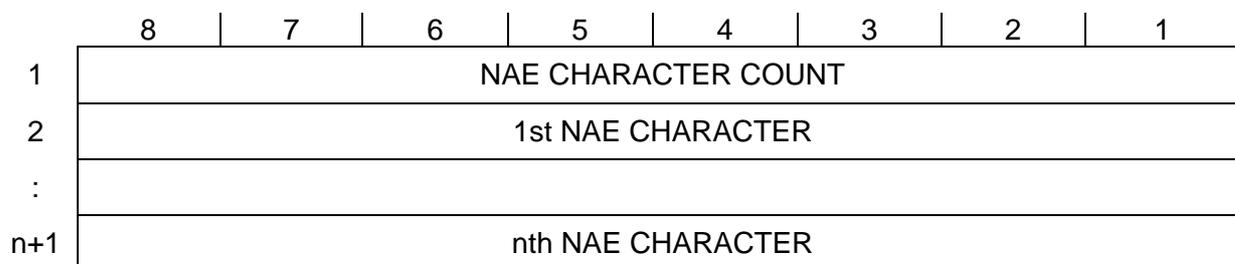
FIGURE 2.25
**Six Character NAE Parameter field**

The following codes are defined for use in the sub-fields of the Six Character NAE parameter field.

#### a)  NAE Character Count

Set to provide a binary indication of the number of NAE Characters (octets) contained within the NAE Character sub-field (1 to 6 octets).

```
00000000 [0]     reserved
00000001 [1]     )
to               ) Number of NAE Characters included
00000110 [6]     )
00000111 [7]     )
to               ) reserved
11111111 [255]   )
```

#### b)  NAE Characters

These characters are coded using the IA5 character syntax using only digits 0 to 9 by the CPE. The characters shall be transmitted as received from the access signalling system (DASS or DSS1).

### 2.4.30  Type of Answer

Indicating whether the Answer is Answer-chargeable or Answer-non-chargeable. Set by the terminating network.

The format of the Type of Answer parameter is shown in Figure 2.26.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|
| 1 | reserved | | | TYPE OF ANSWER | | | |
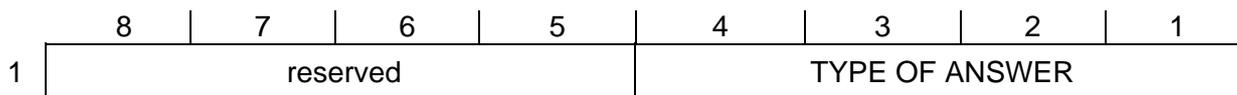
FIGURE 2.26
**Type of Answer parameter**

The following codes are defined for use in the Type of Answer parameter field.

> 0000 [0]   Answer - non-chargeable
> 0001 [1]   Answer - chargeable
> 0010 [2]   )
>  to          ) reserved
> 1111 [15]  )

## 2.4.31  User-to-User Data

See /1/.

## 2.4.32  Call Drop Back Message - Calling Line Information Indicator

See /1/.

## 2.4.33  Call Drop Back Message - Call Log Indicators

See /1/.

## 2.4.34  Call Drop Back Message - Service Control Point (SCP) Information

See /1/.

## 2.4.35  Call Drop Back Message - Translated Address

See /1/.

## 2.4.36  Connection Not Admitted - Diagnostics

The format of the Connection Not Admitted - Diagnostics parameter is shown in Figure 2.27.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|
| 1 | CONNECTION NOT ADMITTED - DIAGNOSTICS | | | | | | |
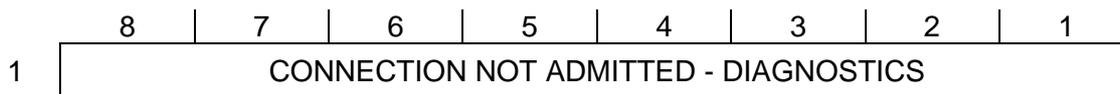
FIGURE 2.27
**Connection Not Admitted - Diagnostics parameter**

The meaning of the Diagnostics parameter in a CNA message shall be dependent on the CNA Reason with which it is associated.

### 2.4.36.1  CNA Reason [7] - Congestion, rerouteing not permitted

The coding of the Diagnostics parameter for CNA Reason [7] shall be as follows:

> 00000000 [0]     no information
> 00000001 [1]     CCBS possible using SCCP/TCAP
> 00000010 [2]     CCBS not possible
> 00000011 [3]     )
> to                    ) reserved
> 11111111 [255]  )

### 2.4.36.2  CNA Reason [8] - Subscriber Engaged

The coding of the Diagnostics parameter for CNA Reason [8] shall be the same as for 2.4.36.1.

### 2.4.36.3  CNA Reasons other than [7] and [8]

The coding of the Diagnostics parameter for CNA Reasons other than [7] and [8] shall be as follows:

```
00000000 [0]      no information
00000001 [1]      )
to                ) reserved
11111111 [255]    )
```

### 2.4.37  ISUP Message

See /1/.

### 2.4.38  EISM Segmentation Information

See /1/.

### 2.4.39  ISUP Message Segment

See /1/.

### 2.4.40  Protocol Negotiation Message Indicators

See /1/.

## 2.A  ANNEX 2.A - Service Indicator Code (SIC) Allocations

### 2.A.1  General

The format of the SIC is shown in Figure 2.A1.

**Note:** The SIC is also used by a receiving PBX for called terminal compatibility checking.

| | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|---|
| 1 | Ext | Routeing/Compatibility Information | | | | | | |
| 2 | 0 | Compatibility Information | | | | | | |

FIGURE 2.A1
**Service Indicator Code**

### 2.A.2  Octet 1

**Bits 4 3 2 1**      **Speech Characteristics/Data Rate** (See appropriate table as indicated by the coding of bits 7, 6, & 5)

**Bits 7 6 5**        **Type of information**
0 0 0 [0]    Speech    - see TABLE 2.A1
0 0 1 [1]    Speech    - see TABLE 2.A2
0 1 0 [2]    data      - see TABLE 2.A3 A/B
0 1 1 [3]    data      - see TABLE 2.A4
1 0 0 [4]    Teletex   - see TABLE 2.A3B
1 0 1 [5]    Videotex  - see TABLE 2.A3B  )
1 1 0 [6]    Facsimile - see TABLE 2.A3B  ) Note 1
1 1 1 [7]    SSTV      - see TABLE 2.A3B  )

**Bit 8**        **Extension bit**
0            no further octet
1            further octet

NOTE 1 - Higher layer compatibility information may be included by the calling PBX when the higher layer application supported by the calling terminal is known.  The called PBX should not necessarily reject an incoming call in which the SIC specifies higher layer compatibility information and the higher layer application supported by the called terminal is not known.

TABLE 2.A1
**Details of Speech Characteristics**

```
0 0 0 0 [0]   A-Law 64kbit/s (Note 1)
0 0 0 1 [1]   )
to            ) reserved (Note 2)
1 1 1 1 [15]  )
```

NOTE 1 - Used on incoming calls from non-ISDN users and ISDN Phase 1 (i.e. pilot single line IDA) Telephony users. This code may also be used for outgoing Telephony calls in DASS2.

NOTE 2 - Reserved - defaults to Telephony routeing within the Public Network, (i.e. A-law, 64kbit/s Digital; or Analogue routeing).

TABLE 2.A2
**Details of Speech Characteristics**

| | |
|---|---|
| 0 0 0 0 [0] | A-Law 64kbit/s (Category 2) digital or analogue routeing (Note 1) |
| 0 0 0 1 [1] | reserved (Notes 2,4) |
| 0 0 1 0 [2] | A-Law 64kbit/s PCM, (Category 1) fully digital path required (Note 3) |
| 0 0 1 1 [3] | reserved (Note 4) |
| 0 1 0 0 [4] | ) |
| to | ) reserved |
| 0 1 1 1 [7] | ) |
| 1 0 0 0 [8] | 3.1kHz Audio |
| 1 0 0 1 [9] | ) |
| to | ) reserved (3.1kHz Audio) (Note 5) |
| 1 1 1 0 [14] | ) |
| 1 1 1 1 [15] | 3.1kHz Audio with FAX Group 2/3 (Note 6) |

NOTE 1 - The call is allowed to continue as a Telephony call if a transparent 64kbit/s routeing is not possible. The SIC is one octet in length.

NOTE 2 - This code is reserved for 32kbit/s ADPCM. The SIC is one octet in length.

NOTE 3 - This code is used for a Category 1 call starting off in the voice mode. The SIC is one octet in length.

NOTE 4 - Reserved - defaults to fully digital routing supported by common channel signalling within the Public Network.

NOTE 5 - When national 3.1 kHz Audio routing is available, the Category 2 (3.1 kHz Audio) SICs provide a Category 2 call which is routed to avoid digital speech processing equipment. Until then, digital speech processing may be introduced depending on the degree of support for 3.1 kHz Audio routing encountered on the call. The SIC can comprise one or two octets. The second octet, when required, is encoded in accordance with the scheme for 3.1 kHz Audio (see 2.3.2).

NOTE 6 - This code is used to indicate a request for a 3.1 kHz Audio call with Facsimile Group 2/3. The SIC is normally one octet although the second octet, if provided, is transferred by the Public Network.

TABLE 2.A3a
**Data Rates for 1 OCTET Structure**

| | |
|---|---|
| 0 0 0 0 [0] | reserved |
| 0 0 0 1 [1] | 48000 bit/s  (6+2 rate adaptation) * |
| 0 0 1 0 [2] | 9600 bit/s   (6+2 rate adaptation) * |
| 0 0 1 1 [3] | reserved |
| 0 1 0 0 [4] | 4800 bit/s   (6+2 rate adaptation) * |
| 0 1 0 1 [5] | 2400 bit/s   (6+2 rate adaptation) * |
| 0 1 1 0 [6] | reserved |
| 0 1 1 1 [7] | reserved |
| 1 0 0 0 [8] | 64000 bit/s * |
| 1 0 0 1 [9] | reserved |
| 1 0 1 0 [10] | reserved |
| 1 0 1 1 [11] | 8000 bit/s in bit 1 * |
| 1 1 0 0 [12] | 4800 bit/s (5-octet frame in bit 1) * |
| 1 1 0 1 [13] | 2400 bit/s (half of 5-octet frame in bit 1) * |
| 1 1 1 0 [14] | 8000 bit/s multi-sampled |
| 1 1 1 1 [15] | 64000 bit/s multi-sampled |

\* There is no requirement for DASS2 PBXs to support these codes, consequently calls using these codepoints may fail.

NOTE - The codes in TABLE 2.A3a are only used on Incoming calls from ISDN PHASE 1 (i.e. pilot single line IDA) NTEs. At some time in the future TABLE 2.A3a will be phased out. The

reserved codes in TABLE 2.A3a are not acted upon by the Public Network but are passed to the Called NTE or PBX, to take the appropriate action, e.g. to initiate clearing.

TABLE 2.A3b
**Data Rates for a 2 OCTET Structure (Category 1 Calls)**

| | |
|---|---|
| 0 0 0 0 [0] | 64000 bit/s |
| 0 0 0 1 [1] | 56000 bit/s |
| 0 0 1 0 [2] | 48000 bit/s |
| 0 0 1 1 [3] | 32000 bit/s |
| 0 1 0 0 [4] | 19200 bit/s |
| 0 1 0 1 [5] | 16000 bit/s |
| 0 1 1 0 [6] | 14400 bit/s |
| 0 1 1 1 [7] | 12000 bit/s |
| 1 0 0 0 [8] | 9600 bit/s |
| 1 0 0 1 [9] | 8000 bit/s |
| 1 0 1 0 [10] | 7200 bit/s |
| 1 0 1 1 [11] | 4800 bit/s |
| 1 1 0 0 [12] | 3600 bit/s |
| 1 1 0 1 [13] | 2400 bit/s |
| 1 1 1 0 [14] | 1200 bit/s |
| 1 1 1 1 [15] | 600 bit/s |

TABLE 2.A4
**Data Rates (Category 1 Calls)**

| | |
|---|---|
| 0 0 0 0 [0] | 300 bit/s |
| 0 0 0 1 [1] | 200 bit/s |
| 0 0 1 0 [2] | 150 bit/s |
| 0 0 1 1 [3] | 134.5 bit/s |
| 0 1 0 0 [4] | 110 bit/s |
| 0 1 0 1 [5] | 100 bit/s |
| 0 1 1 0 [6] | 75 bit/s |
| 0 1 1 1 [7] | 50 bit/s |
| 1 0 0 0 [8] | 75/1200 bit/s (Note 2) |
| 1 0 0 1 [9] | 1200/75 bit/s (Note 2) |
| 1 0 1 0 [10] | 384000 bit/s |
| 1 0 1 1 [11] ) | |
| to ) | reserved (Note 1) |
| 1 1 1 1 [15] ) | |

NOTE 1 - These codes are passed transparently by the Public Network.

NOTE 2 - 75/1200 implies a user data rate of 75 bit/s in the direction calling to called, and 1200/75 vice versa.

### 2.A.3  Octet 2

#### 2.A.3.1  Coding When Octet 1 Does Not Indicate 3.1 kHz Audio

**Bits 3 2 1**

0 0 0 [0] Multi-sampled Asynchronous (no terminal attributes) (Note 1)
0 0 1 [1] Reserved (Note 1)                                       )
0 1 0 [2] Reserved (Note 1)                                       )
0 1 1 [3] Reserved                                                )
1 0 0 [4] Synchronous                                             ) Tables A3b/4 in Octet 1 (Note 2)
1 0 1 [5] Asynchronous with 1 stop bit (Note 3)                   )
1 1 0 [6] Asynchronous with 1.5 stop bit (Note 3)                 )
1 1 1 [7] Asynchronous with 2 stop bits (Note 3)                  )

**Bit 4**         **Duplex Mode**  (Note 1)
0               Full Duplex (FDX)
1               Half Duplex (HDX) (Note 1)

**Bits 7 6 5**      **Data Identification**  (Note 1)
                 For synchronous see TABLE 2.A5 )
                 For asynchronous see TABLE 2.A6)

**Bit 8**               reserved - Set to 0 (zero)

NOTE 1 - When code 000 is used, bits 7, 6, 5 and 4 are each set to 0.  Codes 001 and 010 are reserved for Public Network use of an asynchronous rate adaptation scheme other that ESRA (ESRA = ECMA Standard Rate Adaptation).

NOTE 2 - Code 011 is reserved for a future indication that a rate adaptation scheme for synchronous user rates in accordance with ITU-T Rec. V.110 is being used.  This would imply that status bits are mapped in accordance with Table 3/V.110 in Rec. V.110.

NOTE 3 - Codes 101, 110 and 111 imply asynchronous Rate Adaptation using ESRA (ECMA Standard Rate Adaptation).

TABLE 2.A5
**Data Identification for Synchronous**

| Bit 5 | **Byte Timing** (Note 1) |
|---|---|
| 0 | Not provided |
| 1 | Provided |
| **Bit 6** | **Data Format** |
| 0 | Anonymous or unformatted |
| 1 | X.25 Packet Mode (Note 2) |
| **Bit 7** | **Network Independent Clock** |
| 0 | clock locked to transmission |
| 1 | Bits E4/E5/E6 indicate phase |

NOTE 1 - This bit is used to indicate that the originating end is byte-aligned to the X.30 frame (typically a character-oriented device): if 1, the originating end is byte-timed and requires to communicate to a byte-timed device: if 0, the originating end is not byte-timed (this applies for V series interfaces, X.21bis interfaces, and X.21 interfaces that do not have the byte timing implemented).  If byte timing is provided, the E7 bit in the X.30 frame is used for multi-frame synchronisation at 600 bit/s: if byte timing is not provided, the multi-frames may not start on true character boundaries.

NOTE 2 - X.25 Packet Mode signifies that data packets plus flags are present in the data bits of the X.30 frames.

TABLE 2.A6
**Data Identification for Asynchronous**

| Bits 6 5 | Data Format |
|---|---|
| 0 0 [0] | Unspecified number of data bits |
| 0 1 [1] | 5 data bits |
| 1 0 [2] | 7 data bits |
| 1 1 [3] | 8 data bits |
| | |
| **Bit 7** | **Flow Control** |
| 0 | TA does not have capability |
| 1 | TA has ESRA capability |

### 2.A.3.2 Coding When Octet 1 Indicates 3.1 kHz Audio

**Bits 6 5 4 3 2 1**    **Modem Type** - see TABLE 2.A7

**Bit 7**        **Duplex Mode** (Note 1)
   0             Half Duplex
   1             Full Duplex

**Bit 8**        reserved, set to 0 (zero)

NOTE 1 - The coding of the Duplex Mode bit in this Octet 2 scheme is reversed from that in the alternative scheme described in 2.A.3.1. This change aligns the octet with the corresponding ETS300 102-1 Bearer capability information element coding (octet 5d).

TABLE 2.A7
**Modem Type (Note)**

| | |
|---|---|
| 0 0 0 0 0 0 [0] | reserved |
| 0 0 0 0 0 1 [1] | V.21 |
| 0 0 0 0 1 0 [2] | V.22 |
| 0 0 0 0 1 1 [3] | V.22 bis |
| 0 0 0 1 0 0 [4] | V.23 |
| 0 0 0 1 0 1 [5] | V.26 |
| 0 0 0 1 1 0 [6] | V.26 bis |
| 0 0 0 1 1 1 [7] | V.26 ter |
| 0 0 1 0 0 0 [8] | V.27 |
| 0 0 1 0 0 1 [9] | V.27 bis |
| 0 0 1 0 1 0 [10] | V.27 ter |
| 0 0 1 0 1 1 [11] | V.29 |
| 0 0 1 1 0 0 [12] | V.32 |
| 0 0 1 1 0 1 [13] | V.35 |
| 0 0 1 1 1 0 [14] | ) |
| to | ) reserved |
| 1 1 1 1 1 1 [63] | ) |

NOTE - The codings in TABLE 2.A7 align with the ETS300 102-1 (1990-12) as amended by ETS300 102 /A2 (1990-10) Bearer capability information element coding (octet 5d)..

## 2.B  ANNEX 2.B - Validity of Release Reasons when RPI=0

TABLE 2.B1 lists those Release Reasons that are valid when the Release Protocol Indicator (RPI) is not set.  When RPI is set then all Release reason values are valid.

TABLE 2.B1
**Validity of Release Reasons when RPI=0**

| **Release Reason** |
| --- |
| [2]    Network Termination |
| [31]  No Reply |
| [32]  Service Termination |
| [34]  Protocol Violation |
| [36]  Operator Priority Access |
| [47]  Null |
| [48]  Subscriber Call Termination |

**END OF PNO-ISC/SPEC/006 § 2**

# 3  COMMON PROCEDURES

## 3.0  Scope

The purpose of this section of PNO-ISC/SPEC/006 is to provide a library of common call procedures which may be employed across a national interconnect between UK Public Network Operators. The common call control procedures (given in section 3.2) are drawn upon as necessary to realise the services described in later sections. Thus, compliance to a common call control procedure is only necessary for compliance to a service which employs that common call control procedure. Compliance is required to all other sub-sections of section 3.

The C7 IUP signalling between the Incoming and Outgoing Networks is described in detail. Message flows within the networks are not relevant to this specification.

## 3.1  General

This section of PNO-ISC/SPEC/006 gives the totality of the call control procedures, information flows, error handling procedures and timer requirements for the support of IUP services established between UK Public Networks. Circuit control procedures are also described.

The messages, procedures and message parameter codes specific to an IUP service are listed in the specification relevant to the service concerned.

The Message Sequence Diagrams (MSDs) and accompanying numbered text of this section give the message flows across the interface between interconnected Public Networks using C7 IUP.

Details relating to the control of the transmission path are not given in this section, these requirements are given in the individual service sections of this specification.

## 3.2  Common Call Control Procedures

C7 IUP comprises a number of call set up, release and supervision protocols. The set up protocols can be considered as comprising the Bearer Establishment Protocol, necessary for bearer establishment between Incoming and Outgoing Networks, and other protocols used for end-end service provision. The Call Supervision Protocols are used to exchange call status information between networks. Timer procedures are also included, for further information on timers refer to 3.5.

The set up protocols are defined in 3.2.1 and 3.2.2, the Call Supervision Protocols in 3.2.3 and the Bearer Release Protocols in 3.2.4.

The protocols to be used for the establishment of any individual call or Supplementary Service is determined by protocol negotiation initiated by the contents of the C7 IUP SHP parameter field of the Initial Address Message (IAM) or Initial and Final Address Message (IFAM) sent by the Outgoing Network.

The following overview gives the general relationship between C7 IUP Call Set Up Protocols.

**3.2.1 Bearer establishment**

Bearer Establishment Protocol

(Routeing Information,

IAM/IFAM SHP analysis)

**3.2.2 Call establishment**

SHP=0  SHP=1  SHP=2  SHP=XX

Service Handling Protocols

| 3.2.2.1 | 3.2.2.2 | 3.2.2.3 | 3.2.2.4 | 3.2.2.5 |
|---|---|---|---|---|
| Basic (Telephony) Call protocol | ISDN Call protocol | Request Service protocol | Note 2 | SASUI protocol [Note 1] | ACI protocol [Note 1] |

**3.2.3 Call supervision**

| 3.2.3.1 | 3.2.3.2 |
|---|---|
| Unsuccessful call | Established call |
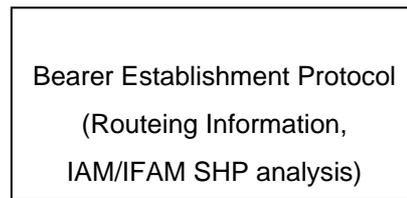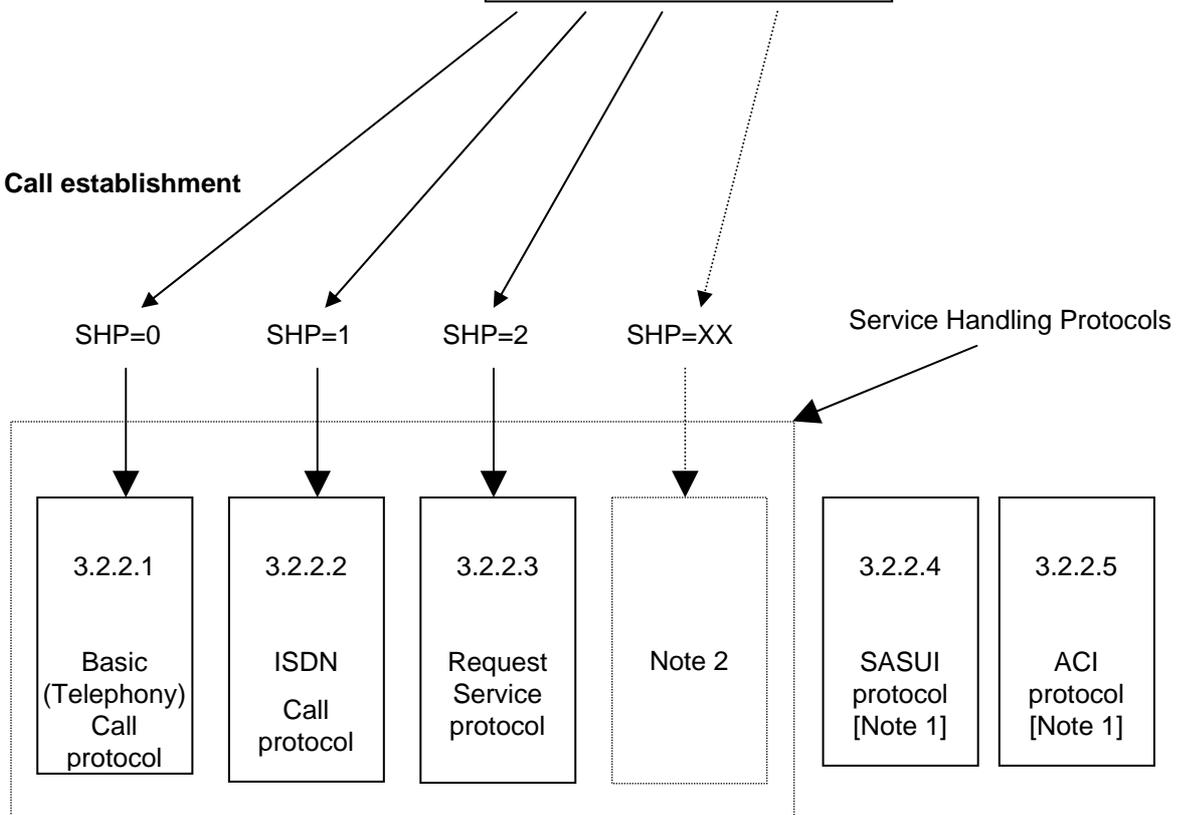
**3.2.4 Bearer release**
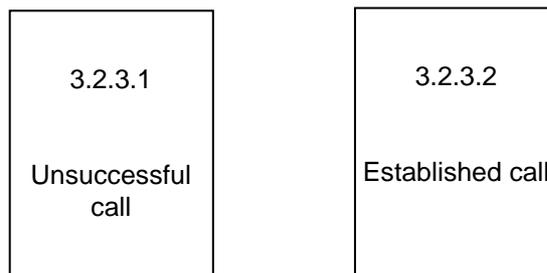
Bearer release protocol
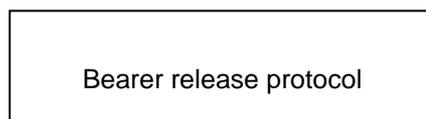
FIGURE 3.1
**C7 IUP Call Setup Protocols**

NOTE 1 -    The ACI and SASUI protocols are used to request and deliver supplementary call information and may be used in conjunction with any of the Service Handling Protocols. The procedures governing the initiation of these protocols are detailed in 3.2.2.4 and 3.2.2.5, reference is also given in 3.2.2.1 to 3.2.2.3 as appropriate.

NOTE 2 -    Further Call Establishment protocol allocations are described in /1/, and more may be specified by ISC in the future.

### 3.2.1 Bearer Establishment Protocol

The IUP Bearer Establishment Protocol provides the messages necessary to:

    i)    set up a bearer connection between Incoming and Outgoing Networks. The bearer connection may be used for a simple telephony call or supplementary service,

    ii)    enable the Incoming Network to identify the required destination,

    iii)    enable the Incoming Network to determine the Service Handling Protocol being requested by the Outgoing Network.


There are three variants of the Bearer Establishment protocol, these being the IFAM Protocol (3.2.1.1), IAM (SND) Protocol (3.2.1.2) and IAM (SAD) Protocol (3.2.1.3). 3.2.1.4 lists procedures designed to minimise the probability of dual seizure of bothway circuits.

During bearer establishment, the Incoming Network may request supplementary information from the Outgoing Network, e.g. Calling Line Identity, using either the SASUI or ACI Protocol (refer to 3.2.2.4 and 3.2.2.5).

### 3.2.1.1 IFAM Protocol

The Bearer Establishment (IFAM) protocol is used when the complete destination address is to be sent in a single message to the Incoming Network.
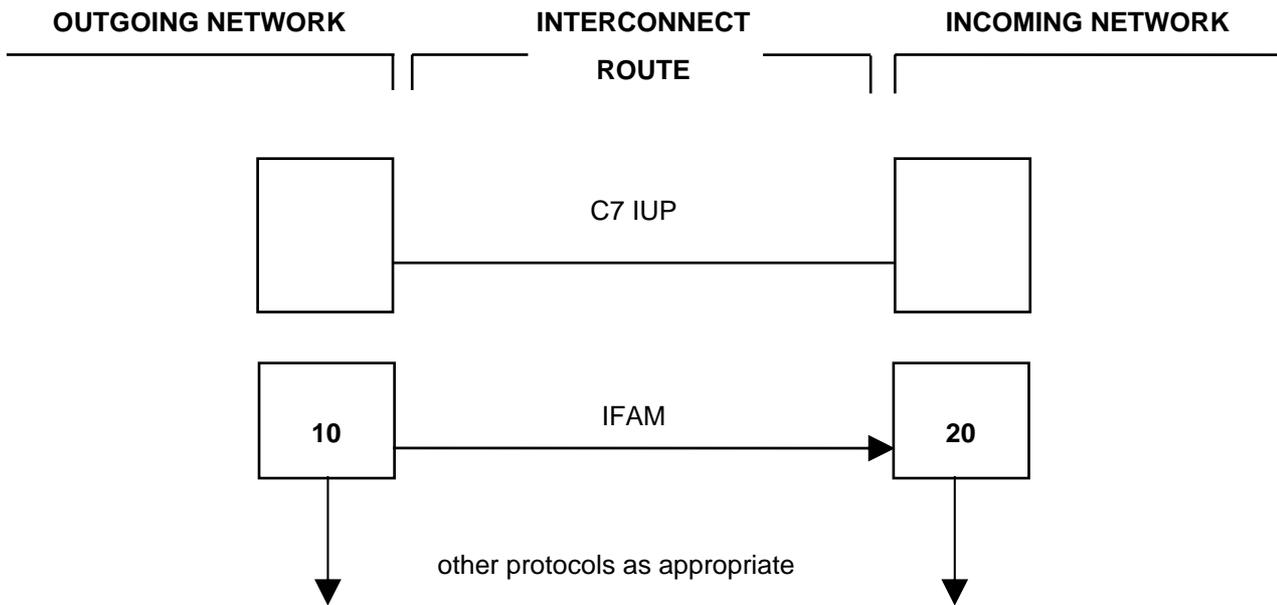


FIGURE 3.2
**Bearer Establishment (IFAM) Protocol**

### 3.2.1.1.10

On determining that a call is required to be routed to the Incoming Network and the IFAM Protocol is to be used, the Outgoing Network shall:

    a)    send an IFAM to the Incoming Network,

    b)    The contents of the IFAM shall be in accordance with the service concerned and are given in the appropriate service section(s) of this specification. The SHP field value shall indicate which C7 IUP Service Handling Protocol is required as follows:

| SHP | IUP Protocol |
|-----|--------------|
| 0 | Basic (Telephony) Call |
| 1 | ISDN Call |
| 2 | Request Service |

   c)    start Timer TO-09,

   d)    start Timer TO-16.

### 3.2.1.1.20

On receipt of an IFAM the Incoming Network shall:

   a)    invoke the ACI Protocol or the SASUI Protocol if it requires additional information from the Outgoing Network at this point in the call. The rules governing the SASUI and ACI protocols are given in 3.2.2.4 and 3.2.2.5 respectively. If, subsequent to completion of either of these protocols the call can proceed, the Incoming Network shall proceed in accordance with 3.2.1.1.20.b),

   b)    determine which specific C7 IUP Service Handling Protocol is required from analysis of the SHP field as follows;

| SHP | IUP Protocol | Ref. |
|-----|--------------|------|
| 0 | Basic (Telephony) Call | 3.2.2.1 |
| 1 | ISDN Call | 3.2.2.2 |
| 2 | Request Service | 3.2.2.3 |

On determination of the protocol required both Incoming and Outgoing Networks shall follow the procedures appropriate to the protocol concerned.

### 3.2.1.1.30

If Timer TO-09 matures then the Outgoing Network shall initiate clear down in accordance with 3.2.4 by sending a forward RELEASE message with reason [02] "Network Termination".

### 3.2.1.1.40

If Timer TO-16 matures then the Outgoing Network shall initiate clear down in accordance with 3.2.4 by sending a forward RELEASE message with reason [02] "Network Termination".

### 3.2.1.2  IAM (SND) Protocol

This Bearer Establishment protocol is used when the destination address is to be sent using a number of messages in a compelled fashion to the Incoming Network.

NOTE - This protocol is normally used in a mixed number length numbering plan when the Incoming Network knows how many digits are required.

| OUTGOING NETWORK | INTERCONNECT ROUTE | INCOMING NETWORK |
|---|---|---|
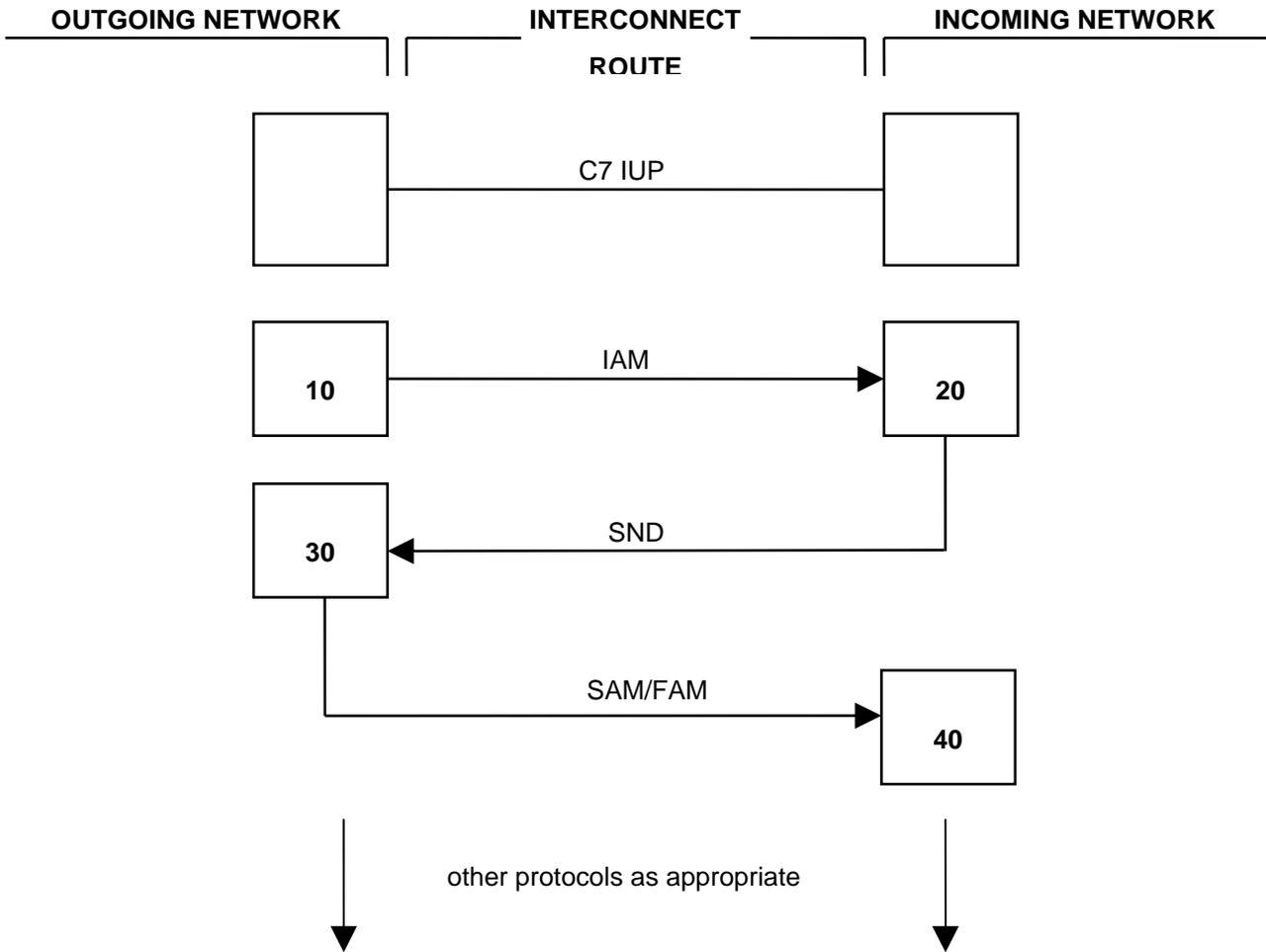


FIGURE 3.3
**Bearer Establishment IAM (SND) Protocol**

### 3.2.1.2.10

On determining that a call is required to be routed to the Incoming Network, the Outgoing Network shall:

    a)   send an IAM to the Incoming Network,

    b)   the contents of the IAM shall be in accordance with the service concerned and are given
         in the appropriate service sections of this specification. The SHP field value shall
         indicate which C7 IUP Service Handling Protocol is required as follows:

| SHP | IUP Protocol |
|---|---|
| 0 | Basic (Telephony) Call |
| 1 | ISDN Call |
| 2 | Request Service |

    c)   start Timer TO-09,

    d)   start Timer TO-16.

### 3.2.1.2.20

On receipt of an IAM the Incoming Network shall:

a) invoke the ACI Protocol or the SASUI Protocol if it requires additional information from the Outgoing Network at this point in the call. The rules governing the SASUI and ACI protocols are given in 3.2.2.4 and 3.2.2.5 respectively. If, subsequent to completion of either of these protocols the call can proceed, the Incoming Network shall proceed in accordance with 3.2.1.2.20.1 or 3.2.1.2.20.2 as appropriate,

b) determine whether further address digits are required, and if so, how many,

### 3.2.1.2.20.1

If a specific number of digits are required then the Incoming Network shall:

a) send an SND message requesting the required number of digits to the Outgoing Network,

b) start Timer TO-18,

c) continue from 3.2.1.2.40.

### 3.2.1.2.20.2

If the Incoming Network does not require more address digits it shall act as for receipt of an IFAM and continue in accordance with 3.2.1.1.20.

### 3.2.1.2.20.3

If further digits are required but the specific number is not known then the procedures of the IAM(SAD) Protocol (3.2.1.3) apply.

### 3.2.1.2.30

On receipt of an SND message the Outgoing Network shall:

a) stop Timer TO-09,

b) take further action depending upon whether the requested number of digits can be provided and whether end of dialling has been detected. See 3.2.1.2.30.1, 3.2.1.2.30.2, 3.2.1.2.30.3 or 3.2.1.2.30.4 as appropriate.

### 3.2.1.2.30.1

If the requested number of digits are available but end of dialling has not been detected, then the Outgoing Network shall:

a) send a SAM containing the requested digits to the Incoming Network,

b) restart Timer TO-09,

c) await a backward message from the Incoming Network, and:

    i) if SND is received proceed from 3.2.1.2.30

    ii) If SAD is received proceed from 3.2.1.3.30.

### 3.2.1.2.30.2

If the requested number of digits are available and end of dialling has been detected then the Outgoing Network shall:

a) send a FAM containing the requested digits to the Incoming Network,

b) restart Timer TO-09.

### 3.2.1.2.30.3

If the requested number of digits are not available but end of dialling has not been detected, then the Outgoing Network shall await further digits.

When sufficient digits have been collected to satisfy the Send N request, the Outgoing Network shall continue as 3.2.1.2.30.2 if end of dialling has now been detected, or as 3.2.1.2.30.1 otherwise.

### 3.2.1.2.30.4

If the requested number of digits are not available but end of dialling has been detected then the Outgoing Network shall initiate clear down in accordance with 3.2.4 by sending a forward RELEASE with reason [02] "Network Termination".

### 3.2.1.2.40

The action of the Incoming Network depends on whether a SAM or FAM is received and whether sufficient digits have been received to complete the call.

### 3.2.1.2.40.1

If a SAM or FAM is received and sufficient digits are contained to enable completion of the call, then the Incoming Network shall:

    a)    stop Timer TO-18,

    b)    act as for the receipt of an IFAM and continue in accordance with 3.2.1.1.20.

### 3.2.1.2.40.2

If a SAM is received and further digits are required to complete the call, then the Incoming Network shall:

    a)    stop Timer TO-18,

    b)    proceed in one of the following ways:

        i)    if a known number of digits are required follow the procedures of 3.2.1.2.20

        ii)    If the number of digits is not known follow the procedures of 3.2.1.3.20.

### 3.2.1.2.40.3

If a FAM is received but further digits are required to complete the call, then the Incoming Network shall send CNA or RELEASE with reason [01] "Address Incomplete" and continue in accordance with 3.2.3.1.

### 3.2.1.2.50

If Timer TO-09 matures then the Outgoing Network shall initiate clear down in accordance with 3.2.4 by sending a forward RELEASE message with reason [02] "Network Termination".

### 3.2.1.2.60

If Timer TO-16 matures then the Outgoing Network shall initiate clear down in accordance with 3.2.4 by sending a forward RELEASE message with reason [02] "Network Termination".

### 3.2.1.2.70

If Timer TO-18 matures then the Incoming Network shall initiate clear down in accordance with 3.2.3.1, by sending a backward RELEASE or CNA message with reason [01] "Address Incomplete".

### 3.2.1.3  IAM (SAD) Protocol

The Bearer Establishment IAM (SAD) protocol is used when the destination address is to be sent using a number of messages in a non-compelled fashion to the Incoming Network.

NOTE - This protocol is normally used when the Incoming Network does not know how many digits are required.

**OUTGOING NETWORK**     **INTERCONNECT**     **INCOMING NETWORK**
**ROUTE**

C7 IUP

| 10 | → IAM → | 20 |

| 30 | ← SAD ← |

| 30 | → SAM → | 40 |

| 50 | → SAM/FAM → | 60 |

other protocols as appropriate
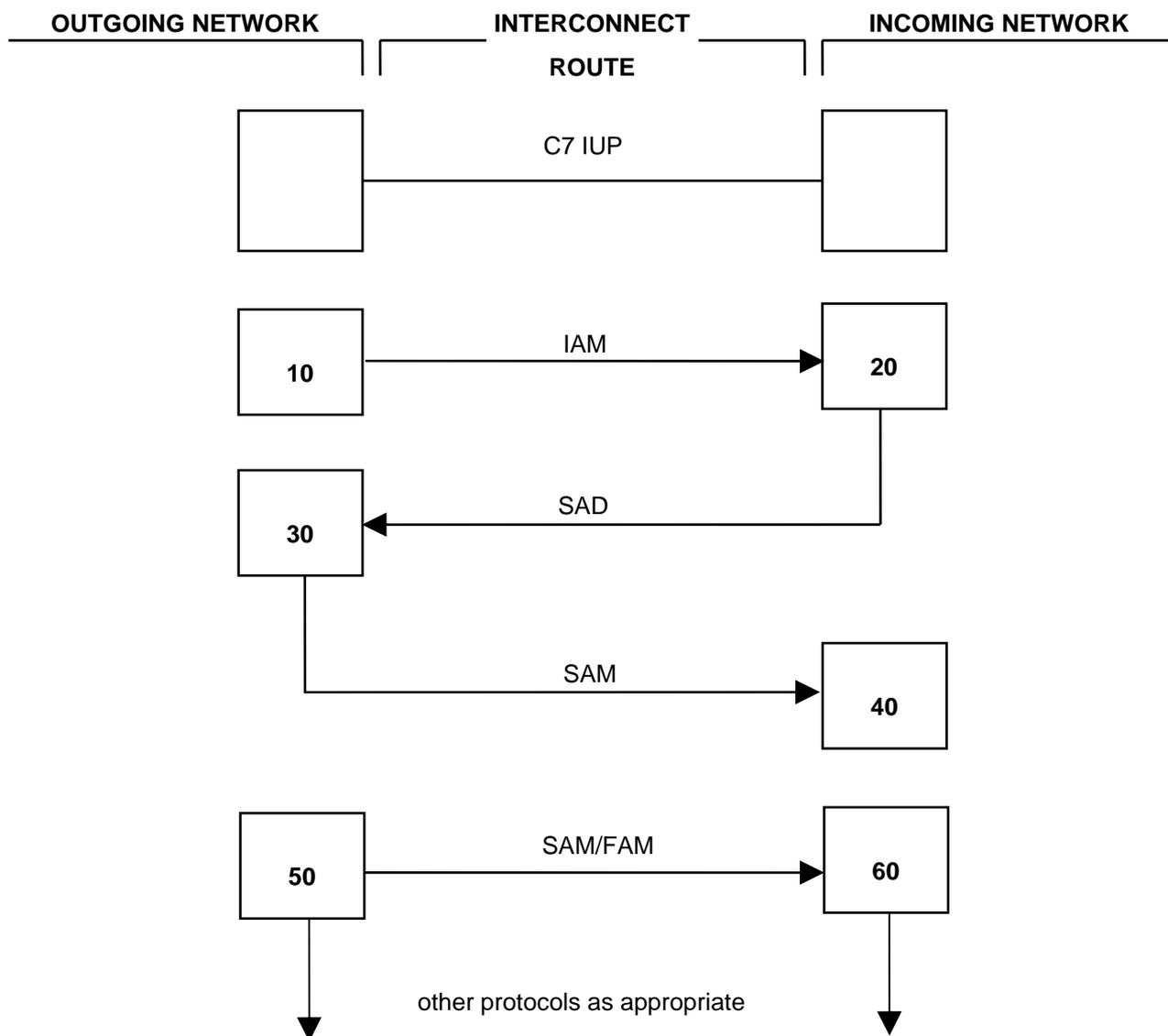
FIGURE 3.4
**Bearer Establishment IAM (SAD) Protocol**

### 3.2.1.3.10

On determining that a call is required to be routed to the Incoming Network, the Outgoing Network shall:

   a)   send an IAM to the Incoming Network,

   b)   the contents of the IAM shall be in accordance with the service concerned and are given in the appropriate service sections of this specification. The SHP field value shall indicate which C7 IUP Service Handling Protocol is required.

|  | **SHP** | **IUP Protocol** |
|---|---|---|
|  | 0 | Basic (Telephony) Call |
|  | 1 | ISDN Call |
|  | 2 | Request Service |

   c)    start Timer TO-09,

   d)    start Timer TO-16.

### 3.2.1.3.20

On receipt of an IAM the Incoming Network shall:

   a)    invoke the ACI Protocol or the SASUI Protocol if it requires additional information from the Outgoing Network at this point in the call. The rules governing the SASUI and ACI protocols are given in 3.2.2.4 and 3.2.2.5 respectively. If, subsequent to completion of either of these protocols the call can proceed, the Incoming Network shall proceed in accordance with 3.2.1.3.20.1 or 3.2.1.3.20.2 as appropriate,

   b)    determine whether further address digits are required, and if so, how many.

### 3.2.1.3.20.1

If more address digits are required but the specific number of digits is not known then the Incoming Network shall:

   a)    send an SAD message to the Outgoing Network,

   b)    start Timer TO-17,

   c)    continue from 3.2.1.3.40.

### 3.2.1.3.20.2

If more address digits are required and the specific number of digits is known then the Incoming Network shall proceed in accordance with the IAM(SND) Protocol as described in 3.2.1.2.20.1.

### 3.2.1.3.20.3

If the Incoming Network does not require more address digits it shall act as for receipt of an IFAM and continue in accordance with 3.2.1.1.20.

### 3.2.1.3.30

On receipt of a SAD message the action of the Outgoing Network depends on whether end of dialling has been detected.

### 3.2.1.3.30.1

If end of dialling has not been detected then the Outgoing Network shall:

   a)    send all available digits in a SAM,

   b)    stop and restart Timer TO-09,

   c)    continue as from 3.2.1.3.50 sending further digits in SAMs or a FAM, as they become available.

### 3.2.1.3.30.2

If end of dialling has been detected then the Outgoing Network shall:

   a)    send all available digits in a FAM,

   b)    stop and restart Timer TO-09.

**3.2.1.3.40**

The action of the Incoming Network depends on whether an initial SAM or FAM is received and whether sufficient digits have been received to complete the call.

**3.2.1.3.40.1**

If an initial SAM or FAM is received and sufficient digits are contained to enable completion of the call, then it shall:

   a)   stop Timer TO-17,

   b)   act as for the receipt of an IFAM and continue in accordance with 3.2.1.1.20.

**3.2.1.3.40.2**

If an initial SAM is received and further digits are required to complete the call, then the Incoming Network shall:

   a)   stop and restart Timer TO-17,

      NOTE - Some existing implementations stop Timer TO-17 and do not restart it.

   b)   continue as in 3.2.1.3.60 awaiting further digits.

**3.2.1.3.40.3**

If an initial SAM is received and the minimum number length has been reached but further digits may be required to complete the call, then the Incoming Network shall:

   a)   stop Timer TO-17,

   b)   start Timer TO-06,

   c)   continue as in 3.2.1.3.60 awaiting further digits.

**3.2.1.3.50**

The Outgoing Network is sending digits as they become available.

**3.2.1.3.50.1**

If a digit is to be sent and end of dialling has been detected, then the Outgoing Network shall:

   a)   send the digit in a FAM to the Incoming Network,

   b)   stop and restart Timer TO-09.

**3.2.1.3.50.2**

If a digit is to be sent and end of dialling has not been detected then the Outgoing Network shall:

   a)   send the digit in a SAM to the Incoming Network,

   b)   stop and restart Timer TO-09,

   c)   continue the procedures of 3.2.1.3.50.

**3.2.1.3.50.3**

If no digit is to be sent but end of dialling is detected, then the Outgoing Network need take no action i.e. an "empty" FAM need not be sent.

**3.2.1.3.60**

The action of the Incoming Network depends on whether a FAM or subsequent SAM is received and whether sufficient digits have been received to complete the call.

### 3.2.1.3.60.1

If a FAM or subsequent SAM is received and sufficient digits are contained to enable completion of the call, then the Incoming Network shall:

a) stop Timer TO-17, if running,

b) stop Timer TO-06, if running,

c) act as for the receipt of an IFAM and continue in accordance with 3.2.1.1.20.

### 3.2.1.3.60.2

If a subsequent SAM is received and further digits are required to complete the call, then the Incoming Network shall:

a) stop and restart Timer TO-17,

  NOTE - Some existing implementations will not be running Timer TO-17 at this point, and do not restart it.

b) follow the procedures of 3.2.1.3.60 awaiting further digits.

### 3.2.1.3.60.3

If a subsequent SAM is received and the minimum number length has been reached but further digits may be required to complete the call, then the Incoming Network shall:

a) stop Timer TO-17, if running,

b) restart Timer TO-06 if running, otherwise start Timer TO-06,

c) continue as in 3.2.1.3.60 awaiting further digits.

### 3.2.1.3.60.4

If a FAM is received but further digits are required to complete the call, then the Incoming Network shall:

a) stop Timer TO-17, if running,

b) stop Timer TO-06, if running,

c) send CNA or RELEASE with reason [01] "Address Incomplete" and continue in accordance with 3.2.3.1

### 3.2.1.3.70

If Timer TO-09 matures then the Outgoing Network shall initiate clear down in accordance with 3.2.4 by sending a forward RELEASE message with reason [02] "Network Termination".

### 3.2.1.3.80

If Timer TO-16 matures then the Outgoing Network shall initiate clear down in accordance with 3.2.4 by sending a forward RELEASE message with reason [02] "Network Termination".

### 3.2.1.3.90

If Timer TO-17 matures then the Incoming Network shall initiate clear down in accordance with 3.2.3.1, by sending a backward RELEASE or CNA message with reason [01] "Address Incomplete".

### 3.2.1.3.100

If Timer TO-06 matures then the Incoming Network shall assume end of dialling has been reached and act as for receipt of an IFAM and continue in accordance with 3.2.1.1.20.

### 3.2.1.4  Dual Seizure (of bothway circuits)

The order of selection of bothway circuits between Incoming and Outgoing Networks shall be agreed bilaterally to minimise the probability of dual seizure, i.e. simultaneous attempts by both Networks to make an Outgoing call on the circuit concerned, is reduced to a minimum. The Network which is allowed call set-up precedence under dual seizure conditions, known as the "controlling Network", shall be agreed bilaterally for each circuit within the bothway route concerned. The procedures required on detection of dual seizure are detailed in the following text.

### 3.2.1.4.1

If a controlling Network, having sent an IAM/IFAM to the non-controlling Network receives an IAM/IFAM in response, it shall ignore the received IAM/IFAM and assume the Outgoing call it has initiated is being processed by the non-controlling Network.

### 3.2.1.4.2

If a non-controlling Network, having sent an IAM/IFAM to the controlling Network receives an IAM/IFAM in response, it shall process the received IAM/IFAM as an Incoming call and re-attempt set-up of the Outgoing call via a different circuit.

### 3.2.2  Call Establishment

### 3.2.2.1  Basic (Telephony) Call Protocol

The IUP Basic (Telephony) Call Protocol provides the messages necessary to establish an end to end connection across and between Incoming and Outgoing Networks suitable for telephony calls.

This protocol is initiated by the Outgoing Network setting SHP=0 in the IAM/IFAM.

FIGURE 3.5
**Basic (Telephony) Call Protocol**

### 3.2.2.1.10

On completion of the Bearer Establishment Protocol, i.e. when all required digits have been received and SHP=0, the Incoming Network shall determine whether the Telephony Protocol can be used on the call.

### 3.2.2.1.10.1

Where the Incoming Network requires to send unsolicited information to the Outgoing Network at this point in the call, it may send an ACI type 4 message to the Outgoing Network and then proceed in accordance with 3.2.2.1.10.2.

### 3.2.2.1.10.2

If the Basic (Telephony) Call Protocol can be used on the call then the Incoming Network shall:

  a)  send an Address Complete message (ACM) to the Outgoing Network, coded in accordance with the IUP service concerned,

  b)  start Timer TO-05.

### 3.2.2.1.10.3

If the Basic (Telephony) Call protocol cannot be used on the call then the call should be failed by the Incoming Network and the procedures of 3.2.3.1 initiated.

### 3.2.2.1.20

On receipt of ACM (and ACI type 4 where CPC=13), the Outgoing Network shall:

a) process the ACI type 4 (if received) and ACM in accordance with the IUP service concerned,

b) stop Timer TO-09,

c) stop Timer TO-16,

d) start Timer TO-02.

### 3.2.2.1.30

When the Called Customer answers the Incoming Network shall:

a) send an Answer message (ANS) to the Outgoing Network,

b) stop timer TO-05.

### 3.2.2.1.40

On receipt of ANS, the Outgoing Network shall:

a) process the ANS in accordance with the IUP service concerned,

b) stop Timer TO-02.

The call has now entered the transmission phase.

### 3.2.2.1.50

If Timer TO-05 matures then the Incoming Network shall initiate clear down in accordance with 3.2.4, by sending a backward RELEASE message with reason [31] "No Reply".

### 3.2.2.1.60

If Timer TO-02 matures then the Outgoing Network shall initiate clear down in accordance with 3.2.4 by sending a forward RELEASE message with reason [31] "No Reply".

### 3.2.2.2    ISDN Call Protocol

The IUP ISDN Call protocol is used to convey ISDN related information between interconnected public networks during call establishment.

This Protocol is requested by the Outgoing Network setting the SHP=1 in the IAM/IFAM.

As the IUP ISDN Call Protocol utilises Group 7 messages (i.e. SIMs), it should be noted that the CONFUSION procedures of 3.3.4 are applicable.

For the purpose of specification the following description is given in terms of:

- SIM-A representing the first backward SIM

- SIM-B representing the forward SIM

- SIM-C representing the final backward SIM

The specific SIM Types that are used is dependent on individual services and are given in the appropriate Sections of this specification.

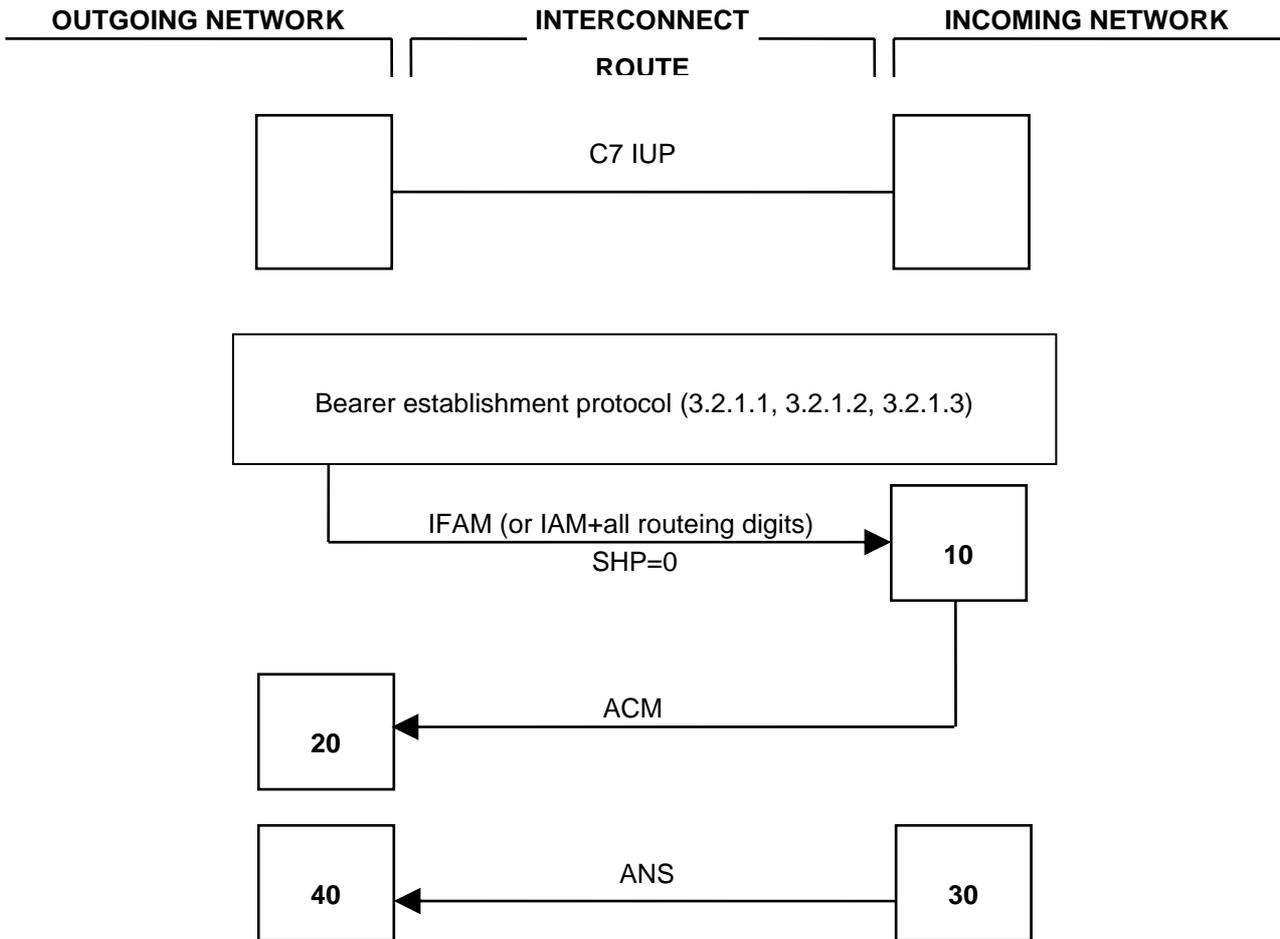| OUTGOING NETWORK | INTERCONNECT ROUTE | INCOMING NETWORK |
|---|---|---|
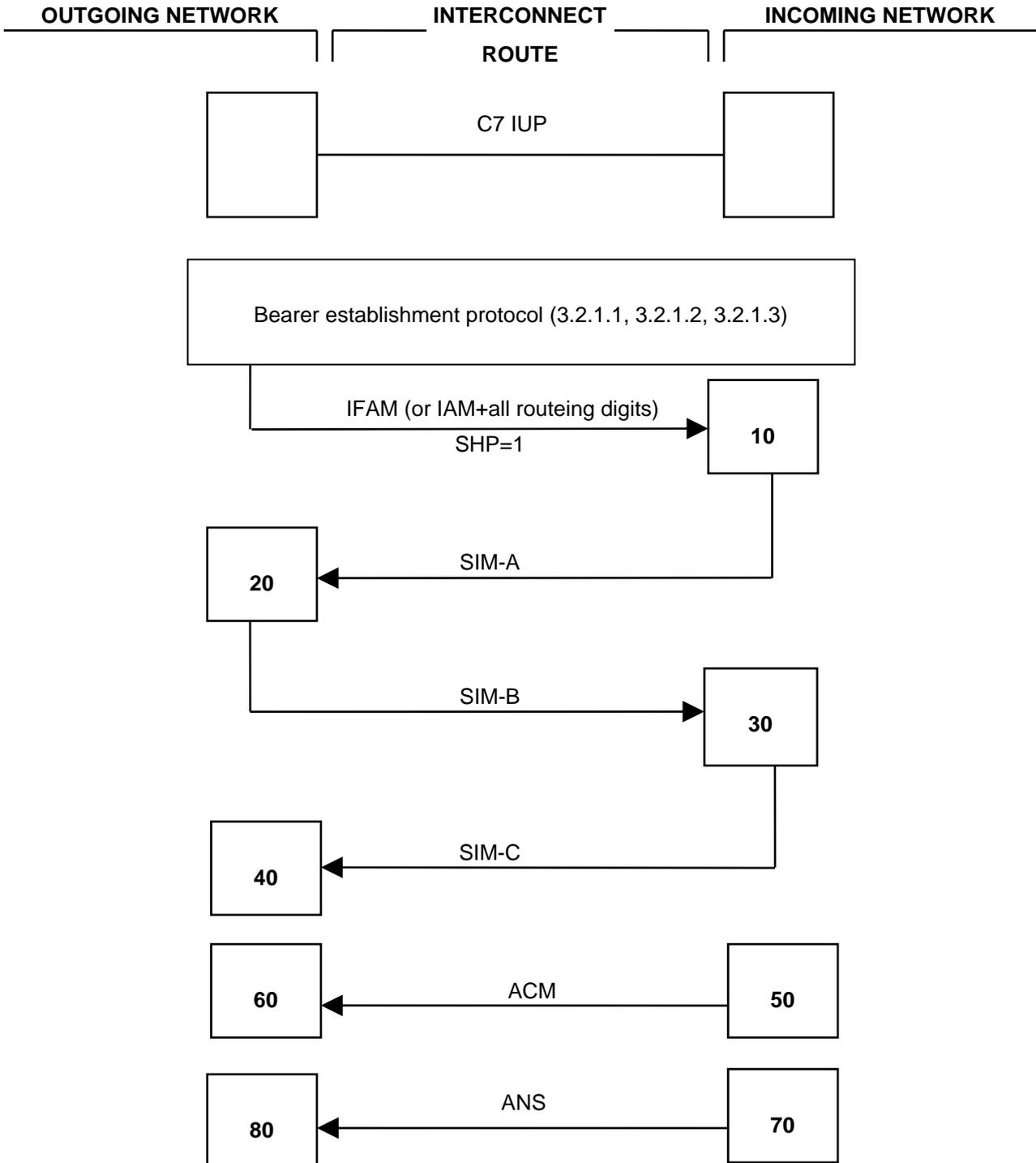


FIGURE 3.6
**ISDN Call Protocol**

**3.2.2.2.10**

On completion of the Bearer Establishment Protocol, i.e. when all of the required digits have been received and SHP=1, the Incoming Network shall determine whether the ISDN Call Protocol can be used on the call.

**3.2.2.2.10.1**

If the Incoming Network requires additional information from the Outgoing Network at this point in the call then it may use the ACI Protocol described in 3.2.2.5. If, subsequent to completion of the ACI Protocol, the call can proceed, the Incoming Network shall continue in accordance with 3.2.2.2.10.2

**3.2.2.2.10.2**

If the ISDN Call Protocol can be used on the call then the Incoming network shall send a SIM-A to the Outgoing Network. The contents of the SIM-A shall be in accordance with the appropriate service concerned and are given in the appropriate service section of this specification.

**3.2.2.2.10.3**

If the ISDN Call Protocol cannot be used on the call then the action of the Incoming Network depends on the value of the CPI parameter field in the received IAM/IFAM. The possible actions are:

i) If CPI=1 then the call shall be rejected by sending a CNA or RELEASE with reason [03] "Service Unavailable" and continue in accordance with 3.2.3.1.2 or 3.2.3.1.3 as appropriate,

ii) If CPI= 0 the call shall continue in accordance with 3.2.2.1.10,

iii) If CPI= 2 the call may either continue in accordance with 3.2.2.1.10 or be rejected in accordance with i).

**3.2.2.2.20**

On receipt of a SIM-A the Outgoing Network shall analyse the contents in accordance with the appropriate service section of this specification.

**3.2.2.2.20.1**

The Outgoing Network shall:

a) Send a SIM-B message to the Incoming Network.

   The contents of the SIM-B shall be in accordance with the appropriate service concerned and are given in the appropriate service section of this specification,

b) Stop and Restart Timer TO-09,

c) Continue as 3.2.2.2.40.

**3.2.2.2.20.2**

If, instead of receiving a SIM-A, an ACM is received from the Incoming Network then the action of the Outgoing Network depends on the value of the CPI parameter field in the IAM/IFAM sent to the Incoming Network. The possible actions are:

i) If CPI=1 then the call shall be cleared by sending a RELEASE with reason [02] "Network Termination" and continue in accordance with 3.2.4.1 or 3.2.4.2 as appropriate,

ii) If CPI= 0 the call shall continue in accordance with 3.2.2.1.20

iii) If CPI= 2 the call may either continue in accordance with 3.2.2.1.20 or be rejected in accordance with i).

**3.2.2.2.30**

On receipt of a SIM-B the Incoming Network shall process the call based on the information contained. The action taken will be dependent on the appropriate service concerned and is described in the appropriate service section of this specification.

SEE PAGE 2 FOR THE NORMATIVE INFORMATION

### 3.2.2.2.30.1

If the ISDN Call Protocol can be completed then the Incoming Network shall send a SIM-C message to the Outgoing Network. The contents of the SIM-C shall be in accordance with the appropriate service concerned and are given in the appropriate service section of this specification.

### 3.2.2.2.30.2

If the Incoming Network requires the Outgoing Network to re-send the SIM-B then it shall:

  a)  Send another SIM-A,

  b)  Await SIM-B

### 3.2.2.2.30.3

If CPI= 0 or 2 and the call is to proceed using the Telephony Protocol then the Incoming Network shall:

  a)  Send an ACM,

  b)  Continue in accordance with the Telephony Protocol.

### 3.2.2.2.30.4

If the Incoming Network requires additional information from the Outgoing Network at this point in the call then it may use the ACI Protocol described in 3.2.2.5. If, subsequent to completion of the ACI Protocol, the call can proceed, the Incoming Network shall continue in accordance with 3.2.2.2.30

### 3.2.2.2.30.5

If the ISDN Protocol cannot be completed and the call cannot continue with the Telephony Protocol, then the call shall be rejected by sending a CNA or RELEASE with reason [3] "Service Unavailable" and continue in accordance with 3.2.3.1.2 or 3.2.3.1.3 as appropriate.

### 3.2.2.2.40

A SIM-C, SIM-A, ACI or ACM may be received from the Incoming Network.

### 3.2.2.2.40.1

If a SIM-A is received then the Outgoing Network shall act as described in 3.2.2.2.20.

### 3.2.2.2.40.2

If a SIM-C is received the Outgoing Network shall analyse the information contained in accordance with the appropriate service section of this specification and shall:

  a)  Note completion of the ISDN Call Protocol,

  b)  Continue as 3.2.2.2.60.

### 3.2.2.2.40.3

If, instead of receiving a SIM-C, an ACM is received from the Incoming Network then the action of the Outgoing Network depends on the value of the CPI parameter field in the IAM/IFAM sent to the Incoming Network. The possible actions are:

  i)  If CPI=1 then the call shall be cleared by sending a RELEASE with reason [02] "Network Termination" and continue in accordance with 3.2.4.1 or 3.2.4.2 as appropriate,

  ii)  If CPI= 0 the call shall continue in accordance with 3.2.2.1.20

  iii)  If CPI= 2 the call may either continue in accordance with 3.2.2.1.20 or be rejected in accordance with i).

**3.2.2.2.40.4**

If an ACI (request) is received then the procedures of 3.2.2.5.30 apply.

**3.2.2.2.50**

The Incoming Network has completed the SIM Sequence.

**3.2.2.2.50.1**

If the Incoming Network requires additional information from the Outgoing Network at this point in the call then it may use the ACI Protocol described in 3.2.2.5. If, subsequent to completion of the ACI Protocol, the call can proceed, the Incoming Network shall continue in accordance with 3.2.2.2.50.2

**3.2.2.2.50.2**

If the call can proceed then the Incoming Network shall:

a) Send an ACM message to the Outgoing Network,

The contents of the ACM shall be in accordance with the appropriate service concerned and are given in the appropriate service section of this specification,

b) Start Timer TO-05.

**3.2.2.2.60**

On receipt of an ACM the Outgoing Network shall:

a) Process the ACM in accordance with its contents and parameter values,

b) Stop Timer TO-09,

c) Stop Timer TO-16,

d) Start Timer TO-02.

**3.2.2.2.70**

The Incoming Network is waiting for the called party to answer the call.

**3.2.2.2.70.1**

If the Incoming Network requires additional information from the Outgoing Network at this point in the call then it may use the ACI Protocol described in 3.2.2.5. If, subsequent to completion of the ACI Protocol, the call can proceed, the Incoming Network shall continue in accordance with 3.2.2.2.70.2.

**3.2.2.2.70.2**

When the called party answers the Incoming Network shall:

a) Send an ANS message to the Outgoing Network,

b) Stop Timer TO-05.

The IUP ISDN call is now in the answered state and the ISDN Swap or Suspend/Resume sequences may be invoked (refer to 3.2.3.2).

**3.2.2.2.80**

On receipt of an ANS the Outgoing Network shall:

a) Process the ANS in accordance with its contents and parameter values,

b) Stop Timer TO-02.

The IUP ISDN call is now in the answered state and the ISDN Swap or Suspend/Resume sequences may be invoked (refer to 3.2.3.2).

### 3.2.2.2.90

If Timer TO-05 matures then the Incoming Network shall initiate clear down in accordance with 3.2.4 by sending a backward RELEASE message with reason [31] "No Reply".

### 3.2.2.2.100

If Timer TO-02 expires then the Outgoing Network shall initiate clear down in accordance with 3.2.4 by sending a forward RELEASE message with reason [31] "No Reply"

### 3.2.2.3 Request Service Protocol.

The Request Service Protocol is used when an IUP call requires to utilise one or more of the facilities (over and above "normal" call facilities) provided by an Operator Services function.

There are two variants of the Request Service Protocol; each variant is characterised according to the initiation of the Operator Services function.

The two variants are:

    i)    Request Service (Customer to Operator) - see 3.2.2.3.2,

    ii)    Request Service (Operator to Customer) – see 3.2.2.3.3.

Both of these variants utilise a common initiation protocol - called the Request Service Negotiation Protocol, which is specified separately in 3.2.2.3.1.

As the Request Service Protocol utilises Group 7 messages (i.e. SEND SERVICE, SERVICE), it should be noted that the CONFUSION procedures of subsection 3.3.4 are applicable.

### 3.2.2.3.1 Request Service Negotiation Protocol

Each of the Request Service protocol variants above is initiated by the Outgoing Network setting the IAM/IFAM SHP=2. This causes a SERVICE message request/response sequence as outlined in the following MSD and text. Message flow subsequent to the initial request/response exchange (called the Request Service negotiation protocol) will be in accordance with 3.2.2.3.2 to 3.2.2.3.3 as detailed in the appropriate service sections of this document.
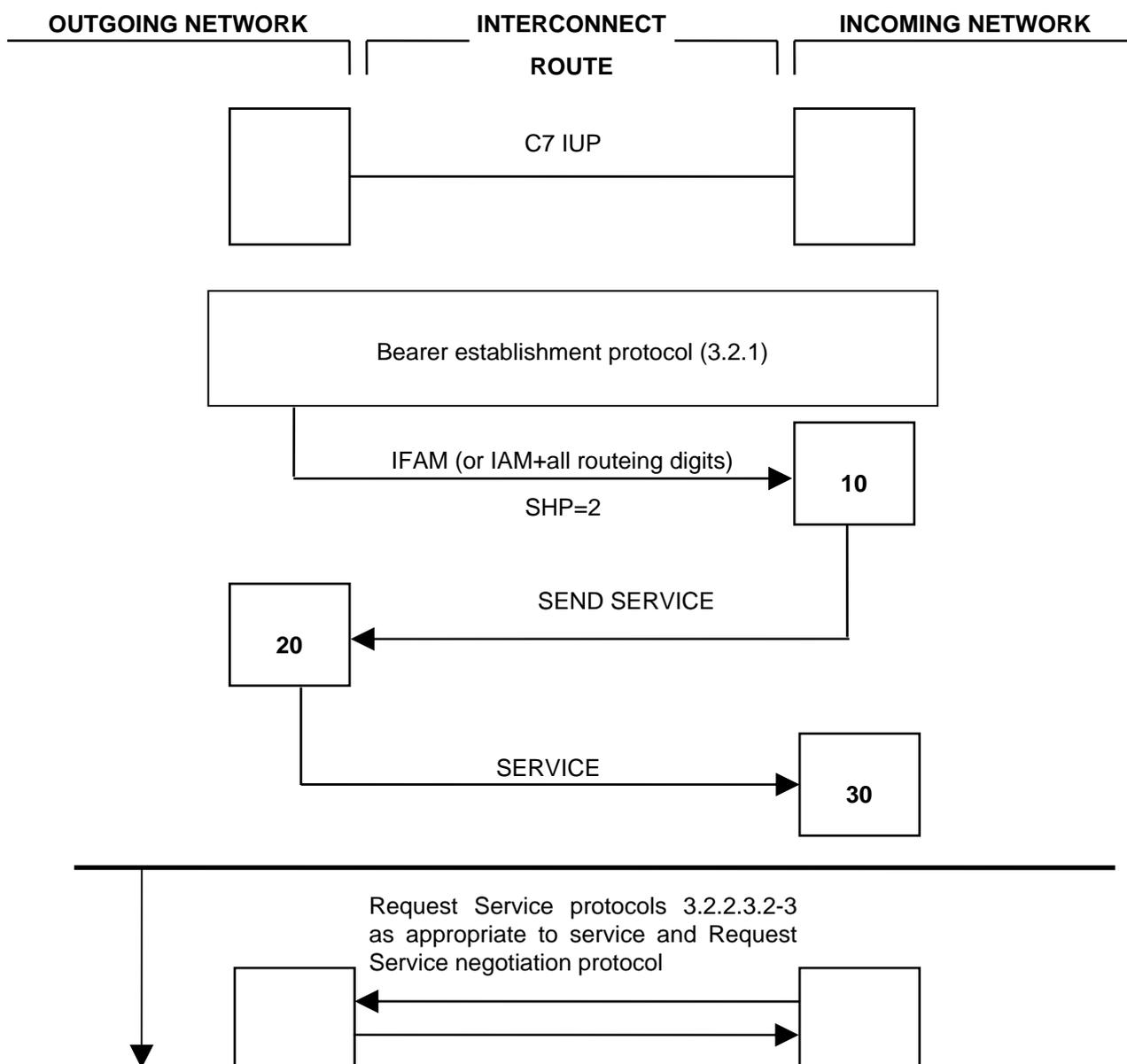
FIGURE 3.7
**Request Service Negotiation Protocol**

### 3.2.2.3.1.10

On completion of the Bearer Establishment Protocol, i.e. when all of the required digits have been received and SHP=2, the Incoming Network shall determine whether the Request Service Protocol can be used on the call.

### 3.2.2.3.1.10.1

If the Request Service Protocol can be used then the Incoming Network shall:

a)  send a SEND SERVICE message to the Outgoing Network,

b)  start Timer TO-14.

### 3.2.2.3.1.10.2

If the Request Service Protocol cannot be used then the Incoming Network shall reject the call by using the procedures described in section 3.2.3.1.

**3.2.2.3.1.20**

On receipt of the SEND SERVICE message the Outgoing Network shall:

    a)   send a SERVICE message to the Incoming Network,

    b)   stop and restart Timer TO-09.

**3.2.2.3.1.30**

On receipt of the SERVICE message the Incoming Network shall:

    a)   process the SERVICE message in accordance with the service concerned,

    b)   stop Timer TO-14,

    c)   progress the call in accordance with 3.2.2.3.2-3 as defined by the service concerned.

**3.2.2.3.1.40**

If Timer TO-09 matures then the Outgoing Network shall initiate clear down in accordance with the procedures described in subsection 3.2.3 by sending a forward RELEASE message with reason [02] "Network Termination".

**3.2.2.3.1.50**

If Timer TO-14 matures the Incoming Network shall initiate clear down in accordance with the procedures described in subsection 3.2.3.1 by sending a backward CNA or RELEASE message with reason [02] "Network Termination".

**3.2.2.3.2  Request Service (Customer to Operator) Protocol**

The Request Service (Customer to Operator) Protocol allows the establishment and maintenance of an IUP call between the Outgoing Network and the Incoming Network for Operator services.

| OUTGOING NETWORK | INTERCONNECT | INCOMING NETWORK |
|---|---|---|
| | **ROUTE** | |

C7 IUP

Request Service Negotiation protocol (3.2.2.3.1)

SERVICE → **10**

ACI protocol (3.2.2.5) (Note 1)

**20**

**30** ← ACM — **20**

**50** ← ANS — **40**

conversation

Note 2     **70** ← EXTEND CALL    **60**
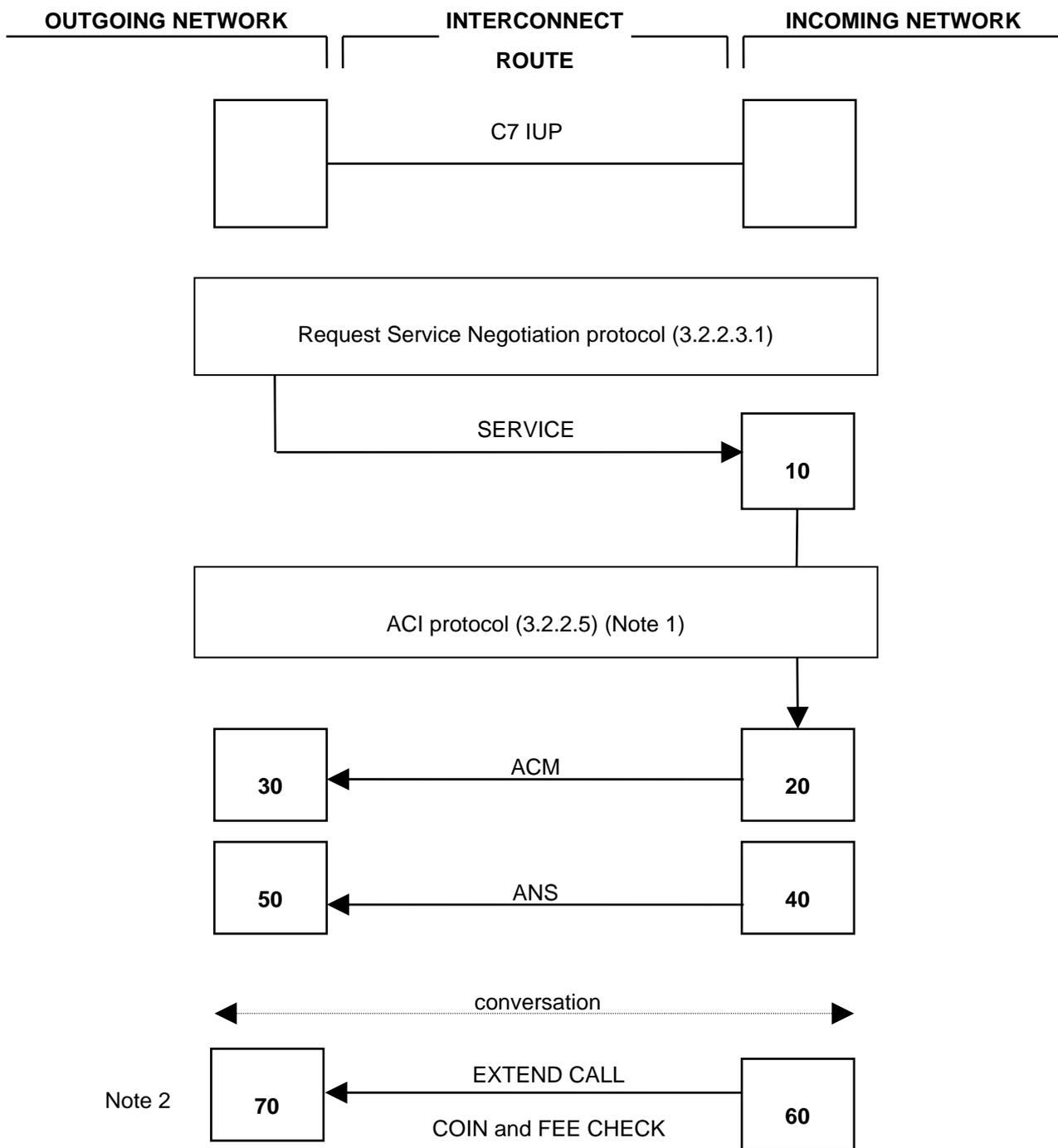
COIN and FEE CHECK

FIGURE 3.8
**Request Service (Customer to Operator) Protocol**

NOTE 1 - The ACI Protocol is described in section 3.2.2.5 and may be employed as necessary to obtain information on both called and calling parties.

NOTE 2 - EXTEND CALL and COIN and FEE CHECK message sending can be considered as established call procedures.

When the Request Service negotiation protocol has been completed the call shall continue in accordance with 3.2.2.3.2.10.

**3.2.2.3.2.10**

If the Incoming Network requires additional information from the Outgoing Network at this point in the call then it may use the ACI Protocol described in 3.2.2.5. If, subsequent to completion of the

ACI protocol, the call can proceed, the Incoming Network shall proceed in accordance with 3.2.2.3.2.20.

### 3.2.2.3.2.20

When the Incoming Network is in a position to indicate an established call condition to the Outgoing Network it shall:

- a) send an ACM to the Outgoing Network,
- b) start Timer TO-05.

If the Incoming Network is unable to indicate an established call condition to the Outgoing Network then the Incoming Network shall fail the call by using the procedures described in subsection 3.2.3.1.

### 3.2.2.3.2.30

On receipt of ACM, the Outgoing Network shall progress the call in accordance with the service concerned.

### 3.2.2.3.2.40

When the Called Operator answers the call the Incoming Network shall:

- a) send an ANS message to the Outgoing Network,
- b) stop timer TO-05.

### 3.2.2.3.2.50

On receipt of ANS, the Outgoing Network shall progress the call in accordance with the service concerned.

### 3.2.2.3.2.60-70

If appropriate to the service concerned, the Incoming Network may:

- i) send an EXTEND CALL message to the Outgoing Network to enable the calling customer to be connected to the required called customer,
- ii) send a COIN and FEE CHECK message to provide control of pay on answer coin boxes.

### 3.2.2.3.2.80

The call now continues in accordance with the service concerned.

### 3.2.2.3.3  Request Service (Operator to Customer) Protocol

The Request Service (Operator to Customer) Protocol allows the establishment and maintenance of an IUP call between Networks, irrespective of the status of the called customer.

**OUTGOING NETWORK**    **INTERCONNECT**    **INCOMING NETWORK**
**ROUTE**

C7 IUP

Request Service Negotiation protocol (3.2.2.3.1)

(IAM/IFAM CPC=13)

SERVICE "oor" → **10**

**20** ← ACI (type 4)(Note 1)

**30** ← ACM

← indication of status (of called customer)

**40** — OOR (Note 2) → **50**

← ring tone (if called customer free)

**60** ← ANS

← conversation →

**70** — HOWLER (Note 3) → **80**
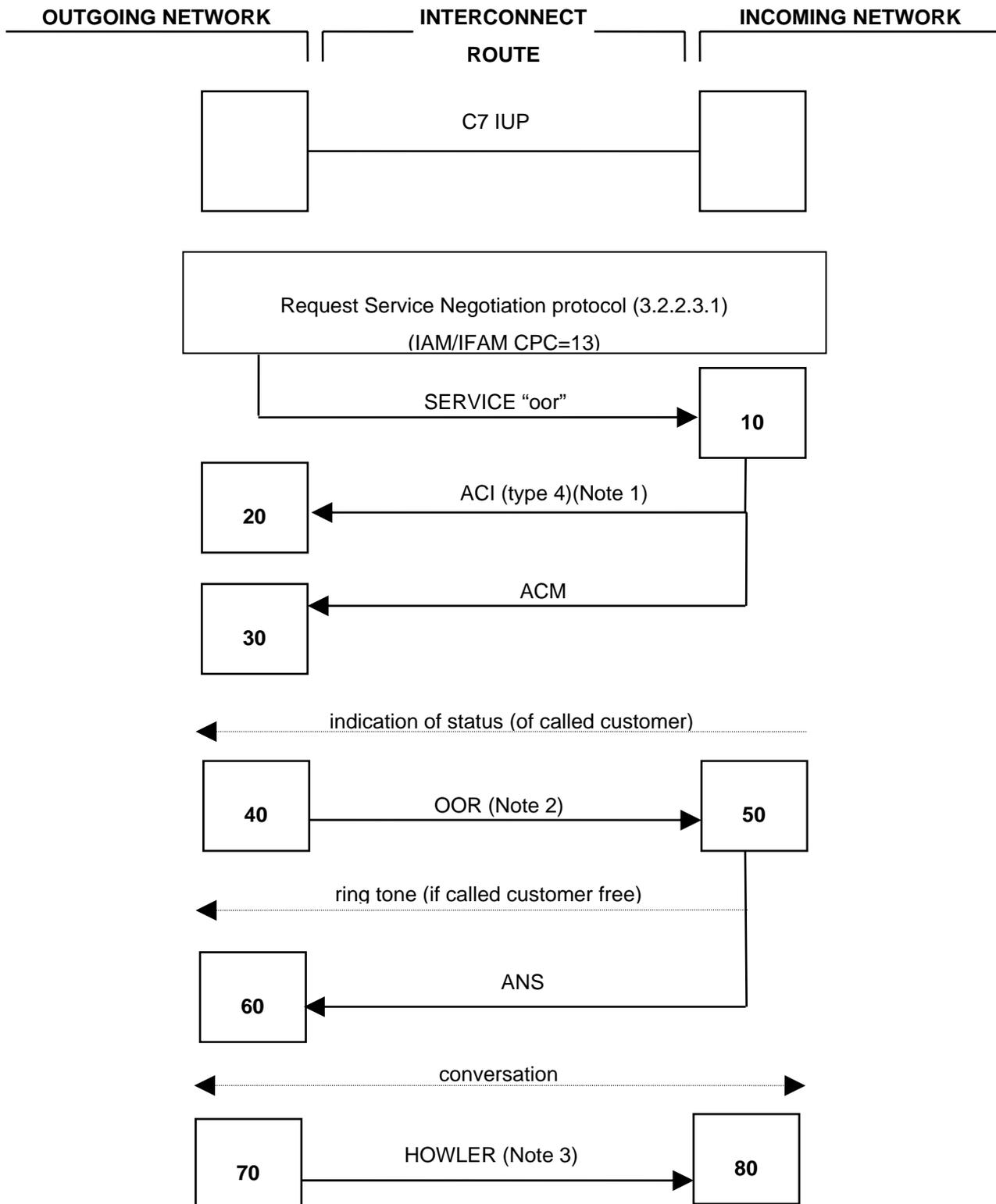
FIGURE 3.9
**Request Service (Operator to Customer) Protocol**

NOTE 1 - The ACI message may be sent directly as a result of recognition of IAM/IFAM CPC=13.

NOTE 2 - The OOR message is sent only if the Operator wishes to continue the call (otherwise RELEASE is sent).

NOTE 3 - The HOWLER message can be considered an established call procedure.

When the Request Service negotiation protocol has been completed the call shall continue in accordance with 3.2.2.3.3.10.

### 3.2.2.3.3.10

If the Incoming Network requires additional information from the Outgoing Network at this point in the call then it may use the ACI Protocol described in 3.2.2.5. If, subsequent to completion of the ACI protocol, the call can proceed, the Incoming Network shall proceed in accordance with 3.2.2.3.3.20.

### 3.2.2.3.3.20

When the Incoming Network is in a position to indicate an established call condition to the Outgoing Network it shall:

  a)   send an ACM to the Outgoing Network,

  b)   start Timer TO-05.

If the Incoming Network is unable to indicate an established call condition to the Outgoing Network then the Incoming Network shall fail the call by using the procedures described in section 3.2.3.1.

### 3.2.2.3.3.30

On receipt of an ACM message, the Outgoing Network shall progress the call in accordance with the service concerned.

### 3.2.2.3.3.40

If appropriate to the service concerned, the Outgoing Network shall send an OOR message to the Incoming Network to enable the called customer's transmission path to be monitored and/or accessed irrespective of its status.

### 3.2.2.3.3.50

On receipt of the OOR message, the Incoming Network shall send an ANS message to the Outgoing Network.

### 3.2.2.3.3.60

On receipt of an ANS message, the Outgoing Network shall progress the call in accordance with the service concerned.

### 3.2.2.3.3.70-80

If appropriate to the service concerned, the Outgoing Network shall send a HOWLER message to the Incoming Network to enable the called customer to receive an audible indication that the receiver is 'off-hook'.

### 3.2.2.3.3.90

The call now continues in accordance with the service concerned.

### 3.2.2.4  SASUI Protocol

The IUP SASUI Protocol is typically used as a general mechanism to request and send supplementary call information and may occur a number of times during a call. The SASUI protocol shall be used if the IAM/IFAM IW bit = 1 (interworking exists). In the non-interworking case, the ACI protocol (see 3.2.2.5) is preferred although the SASUI protocol is still valid.

The SASUI protocol may be initiated by the Incoming Network in order to request CLI. Its use is valid only during the bearer establishment phase of a call (refer to 3.2.1) [i.e. after receipt of IAM/IFAM from the Outgoing Network up to the sending of ACM].

### 3.2.2.4.10

On recognition from analysis of IAM/IFAM/SAM/FAM received from the Outgoing Network that CLI is required, the Incoming Network shall:

  a)   send a SASUI message,

  b)   start Timer TO-14.

### 3.2.2.4.20

The Outgoing Network shall:

  a)   examine and process the contents of the SASUI message,

  b)   send an ASUI message containing either the full or partial CLI,

  c)   stop Timer TO-09 if running.

### 3.2.2.4.30

The Incoming Network shall:

  a)   examine and process the contents of the ASUI received from the Outgoing Network.

  b)   stop Timer TO-14.

On completion of the SASUI protocol the bearer establishment protocol is re-started (refer to 3.2.1).

### 3.2.2.4.40

If an ASUI message is not received by the Incoming Network in response to the SASUI message before the expiry of Timer TO-14, or if an invalid ASUI message is received during the running of Timer TO-14, then the Incoming Network may re-send the SASUI message by repeating the procedures of 3.2.2.4.10.

NOTE - For specific services it may not be considered essential for the Incoming Network to repeat the SASUI message request, in which case the action taken by the Incoming Network on non-receipt of the ASUI message shall be in accordance with 3.2.2.4.50 i.

### 3.2.2.4.50

If an ASUI message is not received by the Incoming Network in response to a final SASUI message before the expiry of Timer TO-14, or if an invalid ASUI message is received during the running of Timer TO-14, then the action of the Incoming Network shall be dependent on whether the information is essential for the call to continue.

  i)   If the Line Identity information is not essential, call set-up shall continue.

  ii)   If the Line Identity information is essential for the call to mature, the Incoming Network shall initiate call failure by sending a CNA/RELEASE message with reason [2] "Network Termination" to the Outgoing Network.

### 3.2.2.5  ACI Protocol

The IUP ACI Protocol is typically used as a general mechanism to request and send supplementary call information and may occur a number of times during a call.

The ACI protocol shall only be initiated when the Outgoing Network has set the IFAM/IAM IW indicator bit to 0.

As the ACI protocol utilises Group 7 messages, it should be noted that the CONFUSION procedures of 3.3.4 are applicable.

Although the MSD and accompanying text in 3.2.2.5 show the Incoming Network initiating an information request, it is also possible for the Outgoing Network to initiate an information request.

The specific ACI Type that is used is dependent on the information requested and the information contained.

An ACI request may be sent and shall be responded to throughout all protocols/call states with the following exceptions:

    i)    Request by Incoming Network

        Idle, between SIM-A and SIM-B, and during release. The preferred response, where the ACI request message is received after receipt of SIM-A but before sending SIM-B, is an ACI response message containing the information requested.

    ii)   Request by Outgoing Network

        Idle, before receipt of ACM and during release.

The ACI request/response procedure shall have no effect on call routeing digit sending procedures (as described in the IAM (SND) and IAM (SAD) protocols). Specifically:

    i)    Subsequent to sending of an IAM the Outgoing Network shall respond to an ACI (request) from the Incoming Network,

    ii)   Subsequent to the ACI request/response exchange the Outgoing Network shall respond to SND and SAD messages from the Incoming Network,

    iii)  The Outgoing Network shall respond to any ACI (request) received from the Incoming Network subsequent to receipt of SND or SAD message (and prior to ACM receipt). Subsequently to responding to the ACI (request) the digit sending process shall be completed.

No subsequent ACI request messages shall be sent until response to the first has been received except the re-sending of the original ACI request in the absence of ACI response prior to Timer TO-14 maturity. Any subsequent ACI request message received prior to sending of ACI response to an earlier ACI request may be ignored.


If an ACI message with an invalid IRC/ICC combination is received (see Table 2.37) then a CONFUSION message shall be sent in response and the ACI message shall be discarded.
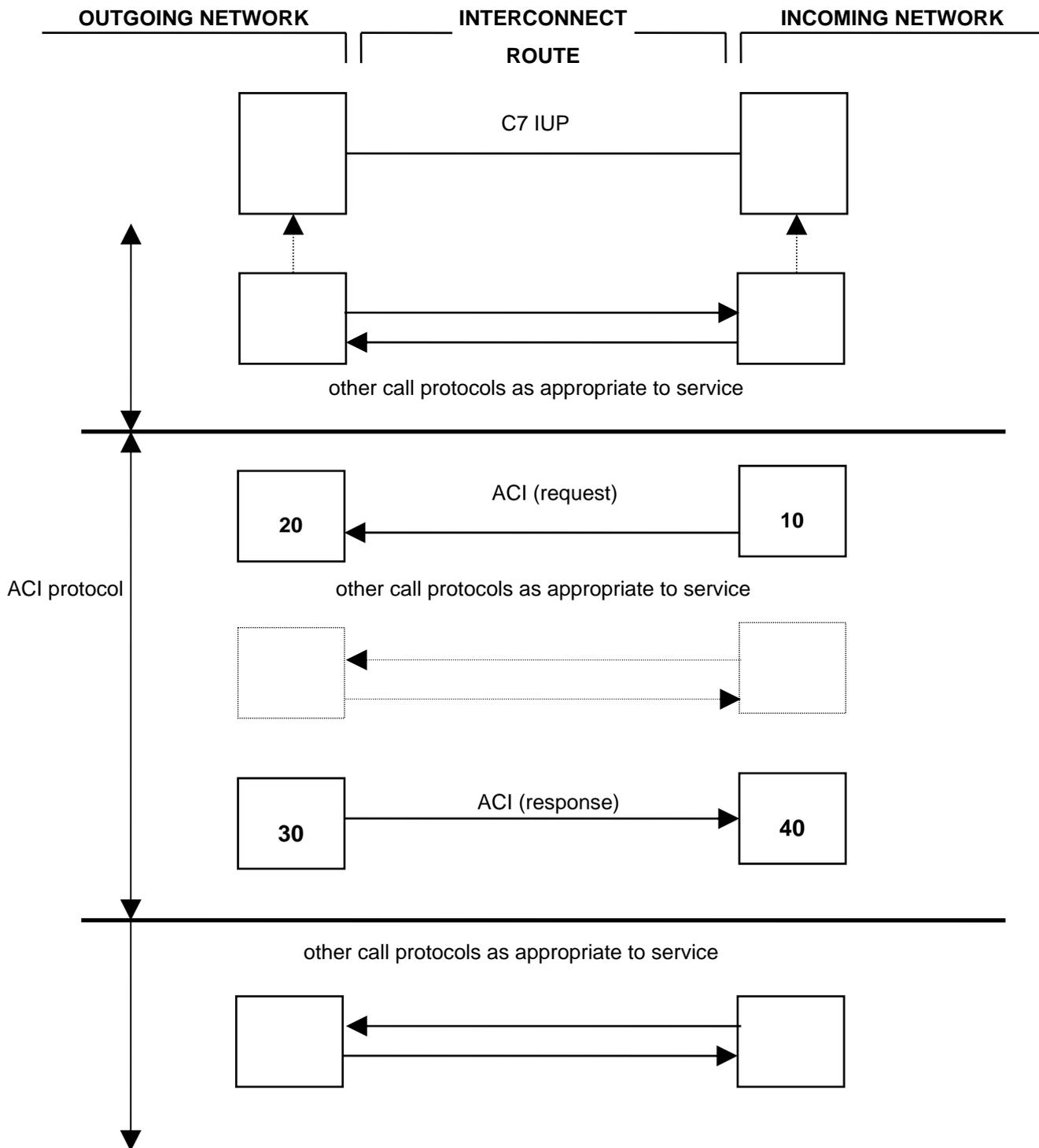
FIGURE 3.10
**ACI Protocol**

**3.2.2.5.10**

On recognition from analysis of message received from the Outgoing Network that supplementary call information is required, the Incoming Network shall:

a) send an ACI (request) to the Outgoing Network and of the type indicated in the appropriate service specific section of this specification,

b) start Timer TO-14.

### 3.2.2.5.20

The Outgoing Network shall examine and process the contents of the ACI (request) in accordance with the service specific sections of this specification.

### 3.2.2.5.30

### 3.2.2.5.30.1

If the Outgoing Network is able to provide an ACI (response) of an appropriate type to the ACI (request), the Outgoing Network shall:

a) send an ACI (response) to the Incoming Network,

b) stop and restart Timer TO-09 if running.

### 3.2.2.5.30.2

If the Outgoing Network is not able to provide an ACI (response) of an appropriate type then the Outgoing Network shall:

a) send a CONFUSION message to the Incoming Network,

b) stop and restart Timer TO-09 if running.

### 3.2.2.5.40

If an ACI (response) of an appropriate type to the ACI (request) is received, the Incoming Network shall:

a) examine and process the contents of the ACI (response) received from the Outgoing Network in accordance with the appropriate service specific section(s) of this specification

b) stop Timer TO-14.

NOTE - If necessary the Incoming network may now repeat the procedure of 3.2.2.5.10 in order to derive more supplementary call information from the Outgoing Network.

On completion of the ACI protocol another protocol is started or resumed - refer to the appropriate service specific sections of this specification.

### 3.2.2.5.50

If an invalid ACI (response) message is received, then it shall be discarded.

### 3.2.2.5.60

If a Confusion message is received in response to an ACI (request) message, during the running of Timer TO-14, then the incoming network shall:

a) stop Timer TO-14

b) further action of the Incoming Network shall be dependent on whether the information is essential for the call to continue.

    i) If the information is not essential, call set-up shall continue.

    ii) If the information is essential for the call to mature, the Incoming Network shall initiate clear down in accordance with 3.2.4 by sending a CNA/RELEASE message with reason [02] "Network Termination" to the Outgoing Network.

### 3.2.2.5.70

If an ACI (response) message is not received by the Incoming Network in response to the ACI (request) message before the expiry of Timer TO-14, or if an invalid ACI (response) message is received during the running of Timer TO-14, then the Incoming Network may re-send the ACI (request) message by repeating the procedures of 3.2.2.5.10.

NOTE - For specific services it may not be considered essential for the Incoming Network to repeat the ACI (request), in which case the action taken by the Incoming Network on non-receipt of the ACI message shall be in accordance with 3.2.2.5.80 i).

### 3.2.2.5.80

If Timer TO-14 expires, then the action of the Incoming Network shall be dependent on whether the information is essential for the call to continue.

    i)    If the information is not essential, call set-up shall continue.

    ii)   If the information is essential for the call to mature, the Incoming Network shall initiate clear down in accordance with 3.2.4 by sending a CNA/RELEASE message with reason [02] "Network Termination" to the Outgoing Network.

## 3.2.3  Call Supervision

The call supervision procedures enable the notification of a change in call status between networks. The following C7 IUP call supervision procedures are specified in 3.2.3.1 (Unsuccessful Call procedures) and 3.2.3.2 (Established Call procedures).

### 3.2.3.1  Unsuccessful Call procedures

For the purposes of this sub-section an unsuccessful call is one for which the Incoming Network is unable to send an ACM.

Various alternative procedures are specified within C7 IUP for the handling of unsuccessful calls. These procedures are described in 3.2.3.1.1 (Called Customer Unavailable - engaged, out of order), 3.2.3.1.2 (Connection Not Completed procedures - CNA) and 3.2.3.1.3 (Connection Not Completed procedures-RELEASE).

Conditional call failure procedures (congestion and repeat attempt) are specified in 3.2.3.1.4 and 3.2.3.1.5 respectively.

Overload Procedures are specified in 3.2.3.1.6

### 3.2.3.1.1  Connection not completed - SUBSCRIBER ENGAGED or SUBSCRIBER OUT OF ORDER procedures

The discrete messages Subscriber Engaged and Subscriber Out of Order have been defined to indicate unsuccessful call establishment due to the called customer being either engaged on another call or being temporarily out of order.

The preferred alternative to the sending of these discrete messages is now sending of the Connection Not Admitted and Release messages with equivalent reason - refer to 3.2.3.1.2 and 3.2.3.1.3 respectively.

The Outgoing Network shall recognise and correctly process the Subscriber Engaged and Out of Order messages by following the procedures given for the receipt of CNA (3.2.3.1.2).

### 3.2.3.1.2  Connection not completed – CNA procedures

NOTE - The procedures described in 3.2.3.1.2 apply only where a call is to be released, other procedures that make use of discrete messages are used where other outcomes may result (for example CONGESTION and REPEAT ATTEMPT).

| OUTGOING NETWORK | INTERCONNECT ROUTE | INCOMING NETWORK |
|---|---|---|

C7 IUP
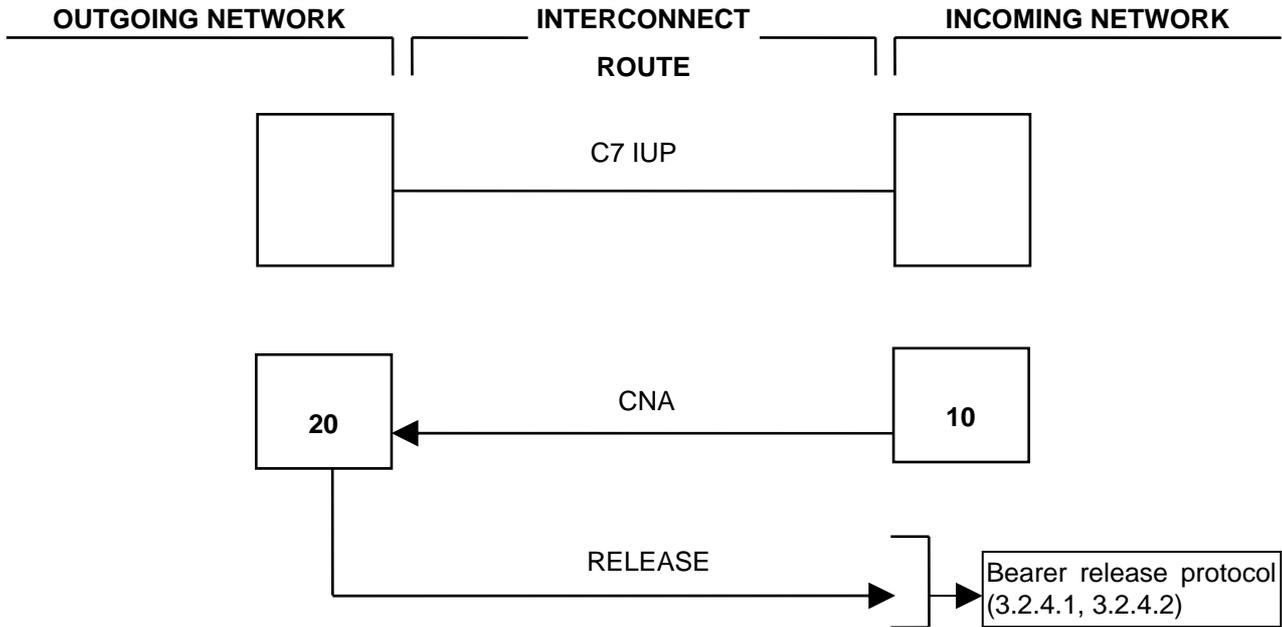


FIGURE 3.11
**Unsuccessful Call - Connection Not Completed - CNA procedures**

CNA is used by the Incoming Network to indicate to the Outgoing Network that a call cannot be established for the appropriate reason. CNA should be considered an Incoming Network status message, and although not part of the Bearer Release sequence itself, will result in its initiation.

CNA messages have a comprehensive range of REASON values - both subscriber status and network status related - these are listed in section 2.4.15. For example the Subscriber Engaged condition is reason [08], the Out of Order reason [09].

The Incoming Network shall not send CNA after it has sent ACM.

### 3.2.3.1.2.10

If the Incoming Network is unable to establish a call it shall:

    a)   send a CNA message with the appropriate reason to the Outgoing Network,

    b)   start Timer TO-10 for receipt of a forward RELEASE message from the Outgoing Network.

### 3.2.3.1.2.20

On receipt of a CNA message the Outgoing Network shall:

    a)   process the CNA message to ensure a suitable indication is given to the calling customer,

    b)   initiate the Bearer Release Protocol of 3.2.4.1.10 or 3.2.4.2.10, as appropriate, by sending a RELEASE message with reason [47] "Null" to the Incoming Network.

### 3.2.3.1.2.30

If Timer TO-10 matures due to non-receipt of the forward RELEASE message, the Incoming Network shall send a backward RELEASE message containing reason [02] "Network Termination" to initiate the Bearer Release Protocol of 3.2.4.3.10 or 3.2.4.4.10, as appropriate.

### 3.2.3.1.3  Connection not completed – RELEASE procedures

The RELEASE message may be used by the Incoming Network to indicate an unsuccessful call as an alternative to CNA only if the Outgoing Network has sent the IAM/IFAM with RPI=1

NOTE - CNA is still permitted, and may be required to support certain services.

NOTE - Other uses of the RELEASE message are described in 3.2.4 (BEARER RELEASE).

RELEASE messages have a comprehensive range of REASON values - both subscriber status and network status related - these are listed in section 2.4.24. For example the Subscriber Engaged condition is reason [08], the Out of Order reason [09].

NOTE - The RELEASE message is detailed in section 2.3.25. Although section 2.3.25 shows the Release reason as an optional parameter, it is required that new implementations of IUP provide this parameter.

This use of the RELEASE message also constitutes the first message of the Bearer Release Protocols as specified in 3.2.4.3, 3.2.4.4, as appropriate.

### 3.2.3.1.4  Congestion Procedures

The discrete CONGESTION message has been defined as a conditional call failure indication to support Automatic Re-routeing (ARR) at call set-up (pre ACM), by the Outgoing Network.

### 3.2.3.1.4.1

Congestion procedures shall only be invoked if the Incoming Network wishes to allow a further attempt at call set-up to the called customer. If congestion is experienced in the Incoming Network and re-routeing attempts are to be inhibited on that call set-up, then the Incoming Network shall send a CNA/RELEASE message containing reason [07] "Congestion - Re-routeing Not Permitted" or the alternative (non-preferred) discrete TERMINAL CONGESTION message to the Outgoing Network. Both networks shall then proceed in accordance with 3.2.3.1.2 or 3.2.3.1.3

### 3.2.3.1.4.2

If the Incoming Network experiences network congestion and re-routeing is permitted it shall:

  a)  send a CONGESTION message to the Outgoing Network,

  b)  start Timer TO-10 for receipt of a forward RELEASE message from the Outgoing Network.

### 3.2.3.1.4.3

On receipt of the CONGESTION message the Outgoing Network shall:

  a)  initiate the Bearer Release Protocol of 3.2.4.1.10 or 3.2.4.2.10, as appropriate, by sending a RELEASE message with reason [47] "Null" to the Incoming Network,

  b)  if appropriate, re-attempt call set-up on an alternative route,

  c)  if the re-attempted call set-up is not successful, or does not apply, ensure a suitable indication is given to the calling customer.

### 3.2.3.1.4.4

If Timer TO-10 matures due to non-receipt of the forward RELEASE message, the Incoming Network shall send a backward RELEASE message containing reason [02] "Network Termination" to initiate the Bearer Release Protocol of 3.2.4.3.10 or 3.2.4.4.10, as appropriate

### 3.2.3.1.5  Repeat Attempt Procedures

The discrete REPEAT ATTEMPT message has been defined as a conditional call failure indication to support a re-attempt at call set-up under detected error or fault situations.

### 3.2.3.1.5.1

If the Incoming Network detects an error or fault situation it may:

a)   send a REPEAT ATTEMPT message to the Outgoing Network,

b)   start Timer TO-10 for receipt of a forward RELEASE message from the Outgoing Network.

### 3.2.3.1.5.2

On receipt of the REPEAT ATTEMPT message the Outgoing Network shall:

a)   initiate the Bearer Release Protocol of 3.2.4.1.10 or 3.2.4.2.10, as appropriate, by sending a RELEASE message with reason [47] "Null" to the Incoming Network,

b)   re-attempt call set-up on a circuit within the same route using the procedures of 3.2.1,

c)   if the re-attempted call set-up is not successful ensure a suitable indication is given to the calling customer.

### 3.2.3.1.5.3

If Timer TO-10 matures due to non-receipt of the forward RELEASE message, the Incoming Network shall send a backward RELEASE message containing reason [02] "Network Termination" to initiate the Bearer Release Protocol of 3.2.4.3.10 or 3.2.4.4.10, as appropriate

### 3.2.3.1.6  Overload Procedures

The Incoming Network may reduce call attempts under "overload" conditions by returning an OVERLOAD message in response to an IAM/IFAM. This will prevent further call attempts on the circuit concerned for a period of 2 minutes. This is achieved by the Outgoing Network delaying the release of the circuit concerned under Timer control.

| OUTGOING NETWORK | INTERCONNECT | INCOMING NETWORK |
|---|---|---|
| | ROUTE | |

C7 IUP

IAM/IFAM →

**10**  **20**

OVERLOAD ←

**30**

RELEASE →
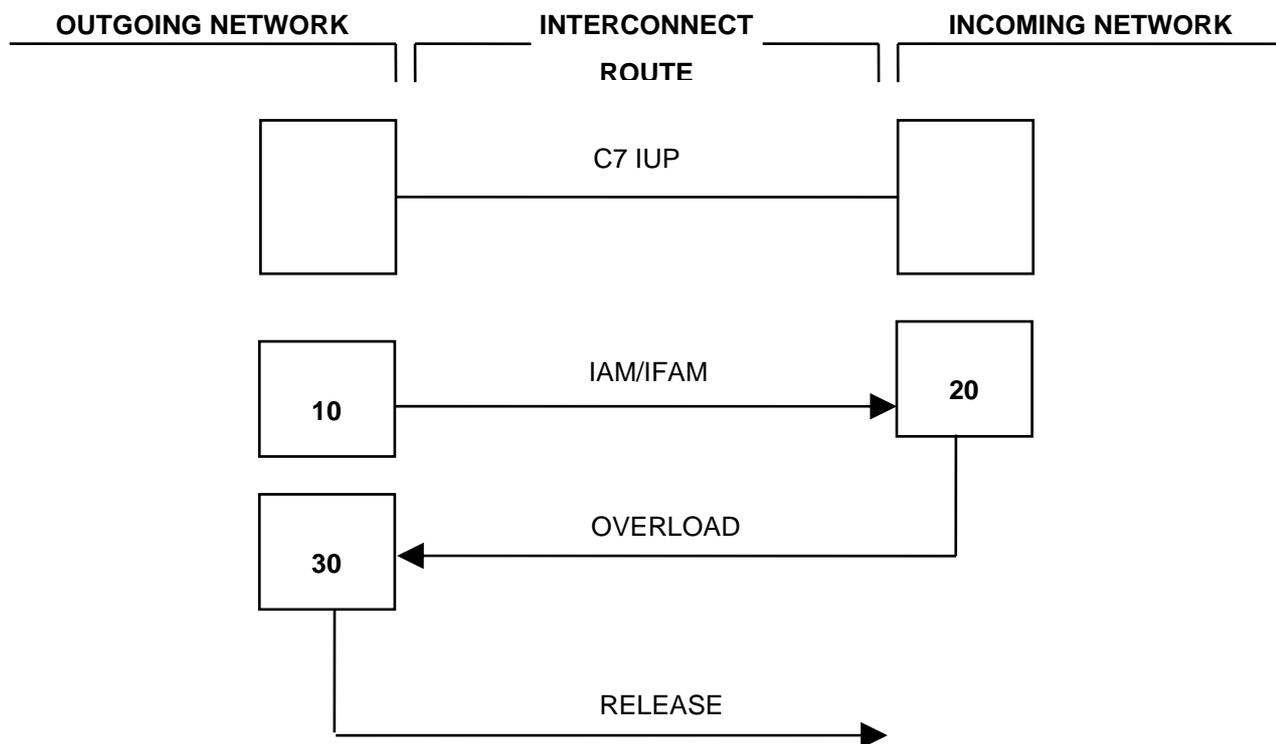
FIGURE 3.12
**Overload Procedures**

### 3.2.3.1.6.10

The Outgoing Network initiates a new call request by sending an IAM/IFAM to the Incoming Network.

### 3.2.3.1.6.20

When the Incoming Network is in an "overload" condition, on receipt of an IAM/IFAM from the Outgoing Network marked as a non-priority, non-protected call, the Incoming Network shall send an OVERLOAD message to the Outgoing Network

### 3.2.3.1.6.30

On receipt of the OVERLOAD message, the Outgoing Network shall:

   a)   start Timer TO-04,

   b)   if appropriate, re-attempt call set-up on an alternative route,

   c)   if the re-attempted call set-up is not successful, or does not apply, ensure a suitable indication is given to the calling customer,

   d)   when Timer TO-04 matures the Outgoing Network shall initiate clear down in accordance with 3.2.4 by sending a forward RELEASE message with reason [47] "Null".

### 3.2.3.2  Established Call procedures

For the purposes of this sub-section an established call is one for which the Incoming Network has sent an ACM.

Four established call supervision procedures are specified in C7 IUP. These are CLEAR (RE-ANSWER) (detailed in 3.2.3.2.1), User Initiated SUSPEND and RESUME (3.2.3.2.2), SWAP (3.2.3.2.3) and RELEASE (3.2.3.2.4).

### 3.2.3.2.1 CLEAR (RE-ANSWER)

CLEAR (RE-ANSWER) procedures may be initiated after any of the protocols specified in 3.2.2 and the Incoming Network has sent ANS.

The CLEAR message is sent by either network to indicate that the calling or called customer has cleared. The RE-ANSWER message is used subsequent to the sending of a CLEAR message to indicate that a previously cleared customer has now reinstated the on-line condition. Refer to service specific sections for more detailed procedures (use of timers, under what specific circumstances each network may utilise the messages etc.).

### 3.2.3.2.2 User Initiated SUSPEND and RESUME

User Initiated SUSPEND and RESUME procedures may be initiated after the ISDN Call protocol (3.2.2.2) and the Incoming Network has sent ANS

The User Initiated SUSPEND message is sent by either network to indicate that the calling or called ISDN customer has temporarily suspended the call. The User Initiated RESUME message is used subsequent to the sending of a User Initiated SUSPEND message to indicate that the call is no longer suspended. Refer to service specific sections for more detailed procedures (use of timers, under what specific circumstances each network may utilise the messages etc.).

### 3.2.3.2.3 SWAP

SWAP procedures may be initiated after the ISDN Call protocol (3.2.2.2) and the Incoming Network has sent ANS

The SWAP message is sent by either Network to indicate that the calling or called ISDN customer wishes to change the bearer capability.

On determining that the SWAP request can be satisfied, the recipient Network returns a SWAP message containing the same SIC as that contained in the received SWAP message. If the SWAP request cannot be satisfied a SWAP message containing the existing mode SIC is returned.

Subsequent to the SWAP exchange the call proceeds normally until either another SWAP exchange or the call is cleared.

Refer to service specific sections for more detailed procedures (use of timers, under what specific circumstances each network may utilise the messages etc.).

### 3.2.3.2.4 RELEASE

The RELEASE procedure may be initiated after any of the protocols specified in 3.2.2 and the Incoming Network has sent ACM.

The RELEASE message is sent by either Network to indicate that the call is to be released.

RELEASE messages have a comprehensive range of REASON parameters - both subscriber status and network status related - these are listed in section 2.4.24.

The RELEASE message is detailed in section 2.3.25. Although section 2.3.25 shows the Release reason as an optional parameter, it is required that all new implementations of IUP provide this parameter. Any RELEASE message received without the RELEASE reason parameter shall be treated as if it contains reason [47] "Null".

The RELEASE message generated constitutes the first message in the appropriate Bearer Release Protocol as specified in 3.2.4.1 to 3.2.4.4.

### 3.2.4  Bearer Release Protocols

The IUP Bearer Release Protocol provides the messages necessary to release the bearer connection between Incoming and Outgoing Networks in a controlled manner. The Release protocol can be initiated in any one of several circumstances:

i)   error conditions (including timer expiry where an expected response message is not received.

ii)  receipt of CNA message (refer to 3.2.3.1.2), or

iii) receipt of RELEASE message itself (refer to 3.2.3.1.3, 3.2.3.2.4), or

iv)  receipt of CONGESTION message (refer to 3.2.3.1.4)

There are four variants of the Bearer Release Protocol. Which is applicable in any given circumstance is dependent on two factors:

i)   whether the circuit between networks is bothway or unidirectional, and

ii)  which of the networks commences the release process.

The four Bearer Release Protocol variants are described as follows:

3.2.4.1   Bearer Release - Outgoing Network Initiated, Unidirectional circuit.

3.2.4.2   Bearer Release - Outgoing Network Initiated, Bothway circuit.

3.2.4.3   Bearer Release - Incoming Network Initiated, Unidirectional circuit.

3.2.4.4   Bearer Release - Incoming Network Initiated, Bothway circuit.

NOTE - Each of the Bearer Release protocols specifies use of the RELEASE message, detailed in section 2.3.25. Although section 2.3.25 shows the Release reason as an optional parameter, it is required that new implementations of IUP provide this parameter.

### 3.2.4.1  Bearer Release - Outgoing Network Initiated, Unidirectional Circuit
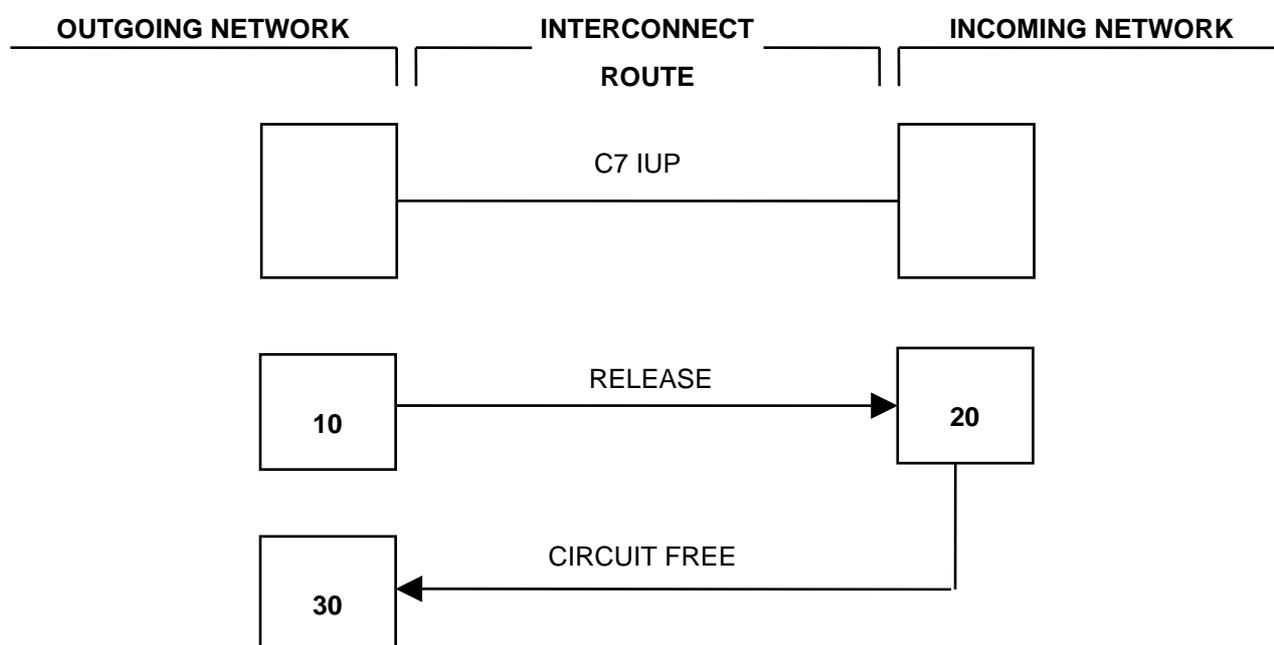


FIGURE 3.13
**Bearer Release (Outgoing Network - Unidirectional Circuit) Protocol**

### 3.2.4.1.10

On determining that the bearer is to be released the Outgoing Network shall:

    a)    send a RELEASE message to the Incoming Network, containing an appropriate REASON,

    b)    stop all timers that are currently running,

    c)    start Timer TO-12 for receipt of CIRCUIT FREE message from the Incoming Network.

### 3.2.4.1.20

On receipt of a RELEASE message from the Outgoing Network, the Incoming Network shall:

    a)    stop all timers that are currently running,

    b)    send a CIRCUIT FREE message to the Outgoing Network when it is in a position to allow the circuit to be used for another call.

### 3.2.4.1.30

i)      On receipt of a CIRCUIT FREE message the Outgoing Network shall:

        a)    stop Timer TO-12,

        b)    allow the circuit to be used for another call.

ii)    On receipt of a BLOCKING message the Outgoing Network shall:

        a)    stop Timer TO-12,

        b)    follow the blocking procedures of 3.4.2.1

**3.2.4.1.40**

If a CIRCUIT FREE (or BLOCKING) message is not received by the Outgoing Network from the Incoming Network in response to a first or second RELEASE message, on the expiry of Timer TO-12, the Outgoing Network shall:

   a)   send a further RELEASE message (with either the original Reason, or reason [47] "Null", or reason [02] "Network Termination") to the Incoming Network,

   NOTE -   It is recommended that new implementations of IUP use the original Release reason.

   b)   if the RELEASE message in a) is the second sent, restart Timer TO-12.

   NOTE -   Timer TO-12 is not restarted on the sending of a third RELEASE message - refer to 3.2.4.1.60.

**3.2.4.1.50**

i)   If a CIRCUIT FREE or BLOCKING message is received by the Outgoing Network from the Incoming Network in response to the second or third RELEASE message sent from the Outgoing Network, the procedures of 3.2.4.1.30 apply.

**3.2.4.1.60**

Subsequent to sending a third RELEASE message, the Outgoing Network shall either:

   i)   Start Timer TO-12a, and continue as described in 3.2.4.1.70.

   NOTE - A maintenance fault report should be generated to indicate the non-receipt of CIRCUIT FREE or BLOCKING.

   or

   ii)   assume the circuit to be blocked by the Incoming Network and mark the circuit as "remotely" blocked, (refer to 3.4.1),

   NOTE - A maintenance fault report should be generated to indicate the non-receipt of CIRCUIT FREE or BLOCKING.

   or

   iii)   assume the Incoming Network has restored the circuit to idle and therefore allow the circuit to be used for another call.

   NOTE - A maintenance fault report may be generated to indicate the non-receipt of CIRCUIT FREE or BLOCKING.

Which of i) or ii) or iii) is applied is implementation dependent, however option i) is recommended for new implementations.

**3.2.4.1.70**

   i)   If a CIRCUIT FREE message is received by the Outgoing Network from the Incoming Network whilst Timer TO-12a is running, the Outgoing Network shall:

   a)   stop Timer TO-12a,

   b)   allow the circuit to be used for another call.

   ii)   If a BLOCKING message is received by the Outgoing Network from the Incoming Network whilst Timer TO-12a is running, then Timer TO-12a shall be stopped and the blocking procedures of 3.4.2.1 shall apply.

   iii)   If a CIRCUIT FREE (or BLOCKING) message is not received on the expiry of Timer TO-12a the Outgoing Network shall send a further RELEASE message with Reason [47] "NULL" to the Incoming Network and restart Timer TO-12a.

**3.2.4.2  Bearer Release - Outgoing Network Initiated, Bothway Circuit**



FIGURE 3.14
**Bearer Release (Outgoing Network - Bothway Circuit) Protocol**

**3.2.4.2.10**

On determining that the bearer is to be released the Outgoing Network shall:

   a)   send a RELEASE message to the Incoming Network, containing an appropriate REASON,

   b)   stop all timers that are currently running,

   c)   start Timer TO-12 for receipt of CIRCUIT FREE message from the Incoming Network.

   NOTE - A RELEASE message will be sent by the Incoming Network before the CIRCUIT FREE message.

**3.2.4.2.20**

On receipt of a RELEASE message the Incoming Network shall:

   a)   stop all timers that are currently running,

   b)   send a RELEASE message containing reason [47] "Null" to the Outgoing Network,

   c)   send a CIRCUIT FREE message to the Outgoing Network when it is in a position to allow the circuit to be used for another call,

   d)   start Timer TO-12 for receipt of CIRCUIT FREE message from the Outgoing Network.

### 3.2.4.2.30

On receipt of a RELEASE message from the Incoming Network, the Outgoing Network shall send a CIRCUIT FREE message to the Incoming Network when it is in a position to allow the circuit to be used for another call.

### 3.2.4.2.40

On receipt of a CIRCUIT FREE message the Incoming Network shall:

    a)    stop Timer TO-12,

    b)    allow the circuit to be used for another call.

### 3.2.4.2.50

On receipt of the CIRCUIT FREE message the Outgoing Network shall:

    a)    stop Timer TO-12.

    b)    allow the circuit to be used for another call.

### 3.2.4.2.60

If RELEASE and CIRCUIT FREE (or BLOCKING) messages are not received by the Outgoing Network from the Incoming Network in response to a first or second RELEASE message, on the expiry of Timer TO-12, the Outgoing Network shall:

    a)    send a further RELEASE message (with either the original Reason, or reason [47] "Null", or reason [02] "Network Termination") to the Incoming Network. It is recommended that new implementations of IUP use the original Release reason,

    b)    if the RELEASE message in a) is the second sent, restart Timer TO-12.

    NOTE -    Timer TO-12 is not restarted on the sending of a third RELEASE message - refer to 3.2.4.2.80.

### 3.2.4.2.70

    i)    If RELEASE and CIRCUIT FREE messages are received by the Outgoing Network from the Incoming Network in response to the second RELEASE message, the normal procedures of 3.2.4.2 apply.

    ii)    If a BLOCKING message, (or RELEASE followed by a BLOCKING message) is received the blocking procedures of 3.4.2.2.1 shall apply.

### 3.2.4.2.80

Subsequent to sending a third RELEASE message, the Outgoing Network shall either:

    i)    Start Timer TO-12a, and continue as described in 3.2.4.2.140.

    NOTE -    A maintenance fault report should be generated to indicate the non-receipt of CIRCUIT FREE or BLOCKING.

    or

    ii)    assume the circuit to be blocked by the Incoming Network and mark the circuit as "remotely" blocked (refer to 3.4.1),

    NOTE -    A maintenance fault report should be generated to indicate the non-receipt of CIRCUIT FREE or BLOCKING.

    or

    iii)    assume the Incoming Network has restored the circuit to idle.

    NOTE -    A maintenance fault report may be generated to indicate the non-receipt of CIRCUIT FREE or BLOCKING.

Which of i), ii) or iii) is applied is implementation dependent, however option i) is recommended for new implementations.

In the case of options ii) or iii) the subsequent action (3.2.4.2.90 i) or ii)) is dependent on whether "local" blocking (refer to 3.4.1) is required.

### 3.2.4.2.90

i)   If the Outgoing Network requires to invoke "local" blocking during the "repeat release" sequence a BLOCKING message shall be sent to the Incoming Network. The Blocking procedures of 3.4.2.2.1 shall then apply.

ii)  If the Outgoing Network does not require to invoke "local" blocking during the "repeat release" sequence, a CIRCUIT FREE message shall be sent to the Incoming Network and the circuit shall be restored to the Idle state and allowed to be used for another call.

### 3.2.4.2.100

If a CIRCUIT FREE (or BLOCKING) message is not received by the Incoming Network from the Outgoing Network in response to a first or second RELEASE message, on the expiry of Timer TO-12, the Incoming Network shall;

a)   send a further RELEASE message (with either the original Reason ([47] "Null"), or reason [02] "Network Termination") to the Outgoing Network. It is recommended that new implementations of IUP use the original Release reason,

b)   if the RELEASE message in a) is the second sent, restart Timer TO-12.

NOTE -   Timer TO-12 is not restarted on the sending of a third RELEASE message - refer to 3.2.4.2.120.

### 3.2.4.2.110

i)   If a CIRCUIT FREE message is received by the Incoming Network from the Outgoing Network in response to the second RELEASE message, the normal procedures of 3.2.4.2 apply.

ii)  If a BLOCKING message is received the blocking procedures of 3.4.2.2.1 shall apply.

### 3.2.4.2.120

Subsequent to sending a third RELEASE message, the Incoming Network shall either:

i)   Start Timer TO-12a, and continue as described in 3.2.4.2.150.

NOTE -   A maintenance fault report should be generated to indicate the non-receipt of CIRCUIT FREE or BLOCKING.

or

ii)  assume the circuit to be blocked by the Outgoing Network and mark the circuit as "remotely" blocked, (refer to 3.4.1.),

NOTE -   A maintenance fault report should be generated to indicate the non-receipt of CIRCUIT FREE or BLOCKING.

or

iii) assume the Outgoing Network has restored the circuit to idle.

NOTE -   A maintenance fault report may be generated to indicate the non-receipt of CIRCUIT FREE or BLOCKING.

Which of i), ii) or iii) is applied is implementation dependent, however option i) is recommended for new implementations.

In the case of options ii) or iii) the subsequent action (3.2.4.2.130 i) or ii)) is dependent on whether "local" blocking (refer to 3.4.1) is required.

**3.2.4.2.130**

i)    If the Incoming Network requires to invoke "local" blocking during the "repeat release" sequence a BLOCKING message shall be sent to the Outgoing Network. The Blocking procedures of 3.4.2.2.1 shall then apply.

ii)    If the Incoming Network does not require to invoke "local" blocking during the "repeat release" sequence, a CIRCUIT FREE message shall be sent to the Outgoing Network and the circuit shall be restored to the Idle state and allowed to be used for another call.

**3.2.4.2.140**

i)    If a CIRCUIT FREE message is received by the Outgoing Network from the Incoming Network whilst Timer TO-12a is running, the Outgoing Network shall:

    a)    stop Timer TO-12a,

    b)    allow the circuit to be used for another call.

ii)    If a BLOCKING message is received by the Outgoing Network from the Incoming Network whilst Timer TO-12a is running, then Timer TO-12a shall be stopped and the blocking procedures of 3.4.2.2.1 shall apply.

iii)    If a CIRCUIT FREE (or BLOCKING) message is not received on the expiry of Timer TO-12a the Outgoing Network shall send a further RELEASE message with Reason [47] "NULL" to the Incoming Network and restart Timer TO-12a.

**3.2.4.2.150**

i)    If a CIRCUIT FREE message is received by the Incoming Network from the Outgoing Network whilst Timer TO-12a is running, the Incoming Network shall:

    a)    stop Timer TO-12a,

    b)    allow the circuit to be used for another call.

ii)    If a BLOCKING message is received by the Incoming Network from the Outgoing Network whilst Timer TO-12a is running, then Timer TO-12a shall be stopped and the blocking procedures of 3.4.2.2.1 shall apply.

iii)    If a CIRCUIT FREE (or BLOCKING) message is not received on the expiry of Timer TO-12a the Incoming Network shall send a further RELEASE message with Reason [47] "NULL" to the Outgoing Network and restart Timer TO-12a.

### 3.2.4.3  Bearer Release - Incoming Network Initiated, Unidirectional Circuit
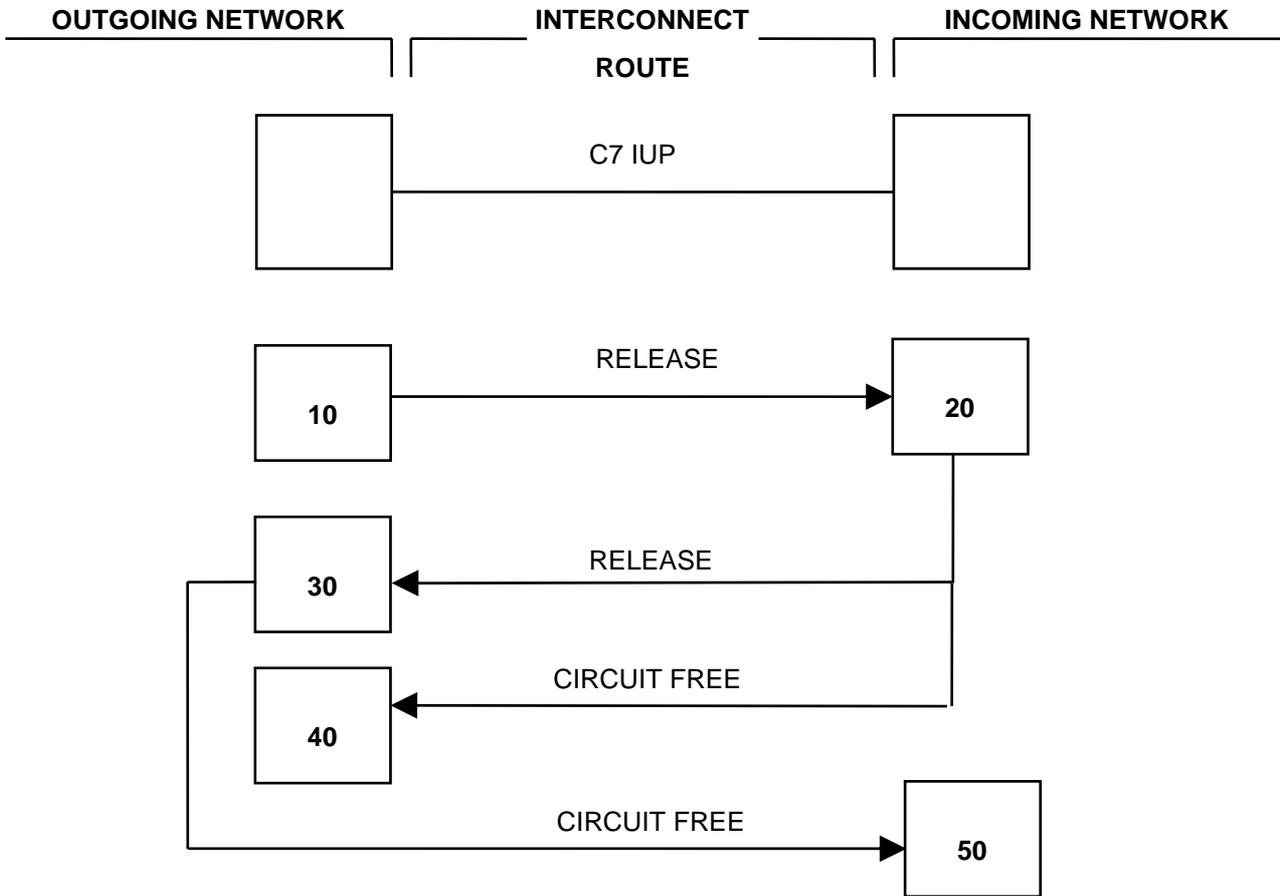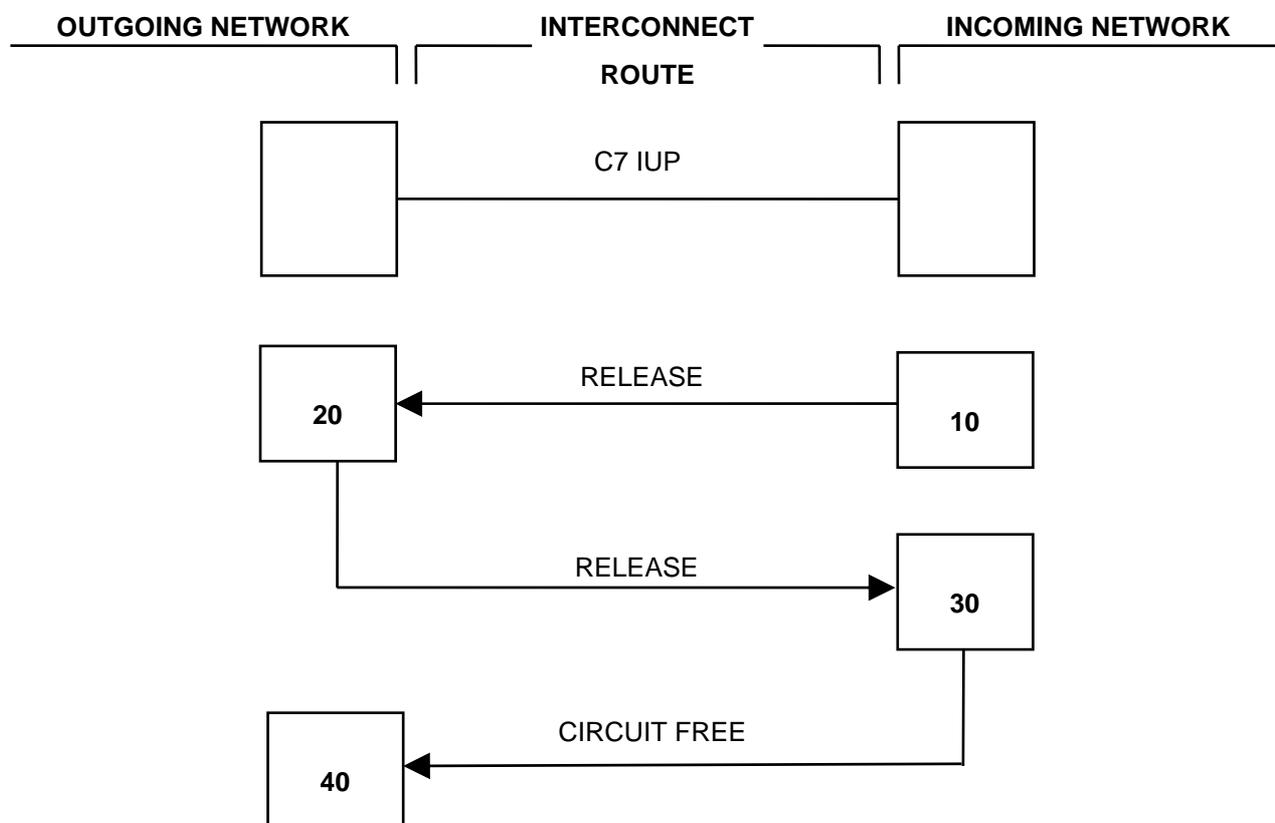


FIGURE 3.15
**Bearer Release (Incoming Network - Unidirectional Circuit) Protocol**

### 3.2.4.3.10

On determining that the bearer is to be released the Incoming Network shall:

  a)   send a RELEASE message to the Outgoing Network, containing an appropriate REASON,

  b)   stop all timers that are currently running,

  c)   start Timer TO-10 for receipt of a forward RELEASE message from the Outgoing Network.

### 3.2.4.3.20-40

The procedures of 3.2.4.1.10 to 3.2.4.1.30 apply.

### 3.2.4.3.50

If a RELEASE message is not received by the Incoming Network from the Outgoing Network in response to a first or second RELEASE message, on the expiry of Timer TO-10, the Incoming Network shall:

  a)   send a further RELEASE message (with either the original Reason, or reason [47] "Null", or reason [02] "Network Termination") to the Incoming Network,

  NOTE -    It is recommended that new implementations of IUP use the original Release reason.

b)   if the RELEASE message in a) is the second sent, restart Timer TO-10.

NOTE -    Timer TO-10 is not restarted on the sending of a third RELEASE message - refer to 3.2.4.3.70.

### 3.2.4.3.60

If a RELEASE message is received by the Incoming Network from the Outgoing Network in response to the second RELEASE message, the procedures of 3.2.4.1.20 shall apply.

### 3.2.4.3.70

Subsequent to sending a third RELEASE message the Incoming Network shall:

i)    If it requires to invoke "local" blocking during the "repeat release" sequence, send a BLOCKING message to the Outgoing Network. The Blocking procedures of 3.4.2.1 shall then apply,

ii)   If it does not require to invoke "local" blocking during the "repeat release" sequence, send a CIRCUIT FREE message to the Outgoing Network and the circuit shall be restored to the Idle state and accept call requests from the Outgoing Network.

### 3.2.4.3.80

If the Outgoing Network, having sent a RELEASE message with reason [47] "Null" to the Incoming Network and started Timer TO-12 in response to the backward RELEASE message received from the Incoming Network, does not receive a CIRCUIT FREE or BLOCKING message in response, on the expiry of Timer TO-12, the "repeat release" procedures of 3.2.4.1.40 shall be initiated.

### 3.2.4.4  Bearer Release - Incoming Network Initiated, Bothway Circuit
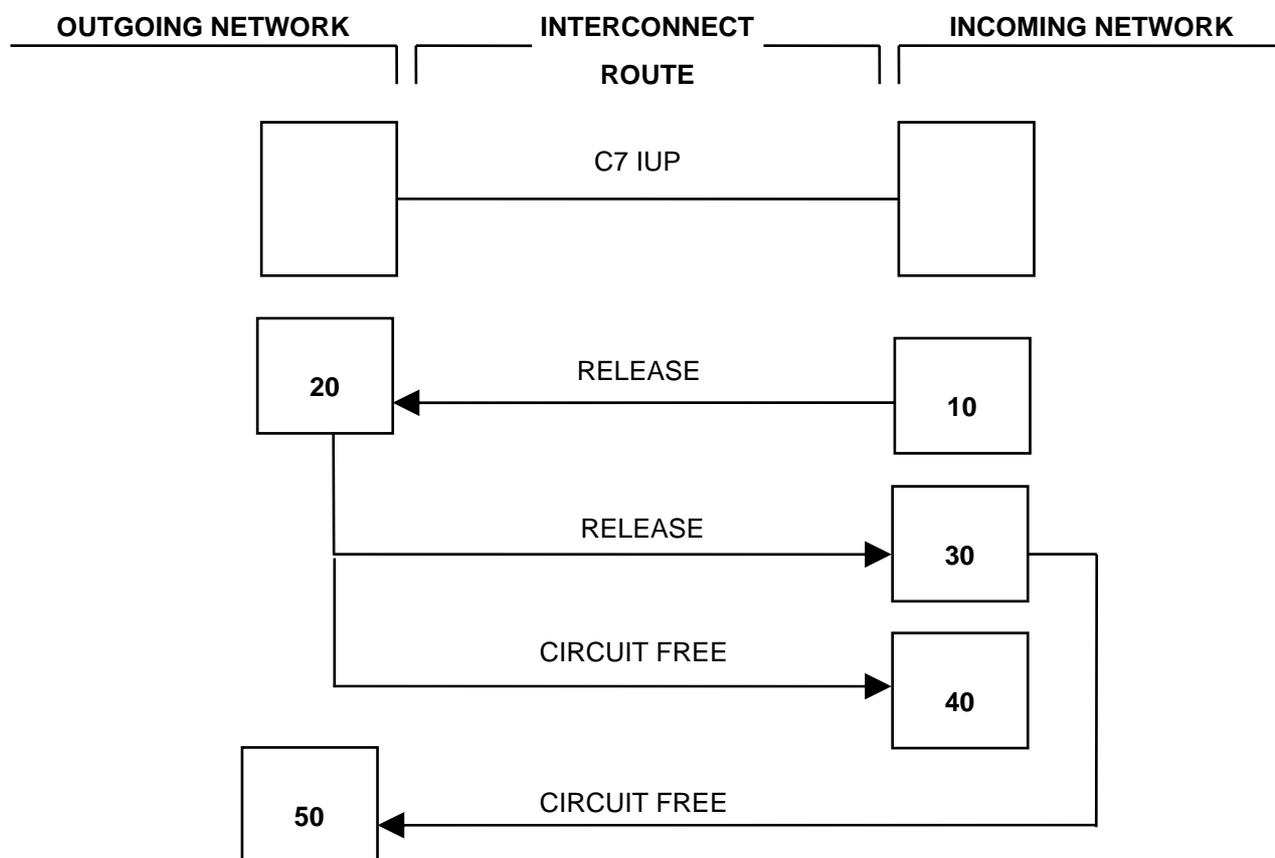


FIGURE 3.16
**Bearer Release (Incoming Network - Bothway Circuit) Protocol**

### 3.2.4.4.10

On determining that the bearer is to be released the Incoming Network shall:

a)  send a RELEASE message to the Outgoing Network, containing an appropriate REASON,

b)  stop all timers that are currently running,

c)  start Timer TO-10 for receipt of a forward RELEASE message from the Outgoing Network,

d)  start Timer TO-12 for receipt of CIRCUIT FREE message from the Outgoing Network.

### 3.2.4.4.20

On receipt of a RELEASE message the Outgoing Network shall:

a)  process the RELEASE message to ensure a suitable indication is given to the calling customer,

b)  initiate release of the circuit by sending a RELEASE message containing reason [47] "Null" to the Incoming Network,

c)  send a CIRCUIT FREE message to the Incoming Network when it is in a position to allow the circuit to be used for another call,

d) stop all timers that are currently running,

e) start Timer TO-12 for receipt of CIRCUIT FREE message from the Incoming Network.

### 3.2.4.4.30

On receipt of a RELEASE message from the Outgoing Network, the Incoming Network shall:

a) stop Timer TO-10,

b) send a CIRCUIT FREE message to the Outgoing Network when it is in a position to allow the circuit to be used for another call.

### 3.2.4.4.40

On receipt of the CIRCUIT FREE message the Outgoing Network shall:

a) stop Timer TO-12,

b) allow the circuit to be used for another call.

### 3.2.4.4.50

On receipt of a CIRCUIT FREE message the Incoming Network shall:

a) stop Timer TO-12,

b) allow the circuit to be used for another call.

### 3.2.4.4.60

If RELEASE and CIRCUIT FREE (or BLOCKING) messages are not received by the Incoming Network from the Outgoing Network in response to a first or second RELEASE message, on the expiry of Timer TO-12 or Timer TO-10, the Incoming Network shall;

a) send a further RELEASE message (with either the original Reason, or reason [47] "Null", or reason [02] "Network Termination") to the Incoming Network. It is recommended that new implementations of IUP use the original Release reason,

b) if the RELEASE message in a) is the second sent, restart Timers TO-12 and TO-10.

NOTE - Timers TO-12 and TO-10 are not restarted on the sending of a third RELEASE message - refer to 3.2.4.4.80.

### 3.2.4.4.70

i) If RELEASE and CIRCUIT FREE messages are received by the Incoming Network from the Outgoing Network in response to the second RELEASE message, the normal procedures of 3.2.4.4 apply.

ii) If a BLOCKING message, (or RELEASE followed by a BLOCKING message) is received the blocking procedures of 3.4.2.2.2 shall apply.

### 3.2.4.4.80

Subsequent to sending a third RELEASE message, the Incoming Network shall either:

i) Start Timer TO-12a, and continue as described in 3.2.4.4.150,

NOTE - A maintenance fault report should be generated to indicate the non-receipt of CIRCUIT FREE or BLOCKING.

or

ii) assume the circuit to be blocked by the Outgoing Network and mark the circuit as "remotely" blocked (refer to 3.4.1),

NOTE - A maintenance fault report should be generated to indicate the non-receipt of CIRCUIT FREE or BLOCKING.

or

iii) assume the Outgoing Network has restored the circuit to idle.

NOTE - A maintenance fault report may be generated to indicate the non-receipt of CIRCUIT FREE or BLOCKING.

Which of i), ii) or iii) is applied is implementation dependent, however option i) is recommended for new implementations.

In the case of options ii) or iii) the subsequent action (3.2.4.4.90 i) or ii)) is dependent on whether "local" blocking (refer to 3.4.1) is required.

### 3.2.4.4.90

i) If the Incoming Network requires to invoke "local" blocking during the "repeat release" sequence a BLOCKING message shall be sent to the Outgoing Network. The Blocking procedures of 3.4.2.2.2 shall then apply.

ii) If the Incoming Network does not require to invoke "local" blocking during the "repeat release" sequence, a CIRCUIT FREE message shall be sent to the Outgoing Network and the circuit shall be restored to the Idle state and allowed to be used for another call.

### 3.2.4.4.100

If a CIRCUIT FREE (or BLOCKING) message is not received by the Outgoing Network from the Incoming Network in response to a first or second RELEASE message, on the expiry of Timer TO-12, the Outgoing Network shall;

a) send a further RELEASE message (with either the original Reason ([47] "Null"), or reason [02] "Network Termination") to the Incoming Network. It is recommended that new implementations of IUP use the original Release reason,

b) if the RELEASE message in a) is the second sent, restart Timer TO-12.

NOTE - Timer TO-12 is not restarted on the sending of a third RELEASE message - refer to 3.2.4.4.120.

### 3.2.4.4.110

i) If a CIRCUIT FREE message is received by the Outgoing Network from the Incoming Network in response to the second RELEASE message, the normal procedures of 3.2.4.4 apply.

ii) If a BLOCKING message is received the blocking procedures of 3.4.2.2.2 shall apply.

### 3.2.4.4.120

Subsequent to sending a third RELEASE message, the Outgoing Network shall either:

i) Start Timer TO-12a, and continue as described in 3.2.4.4.140,

NOTE - A maintenance fault report should be generated to indicate the non-receipt of CIRCUIT FREE or BLOCKING.

or

ii) assume the circuit to be blocked by the Incoming Network and mark the circuit as "remotely" blocked (refer to 3.4.1),

NOTE - A maintenance fault report should be generated to indicate the non-receipt of CIRCUIT FREE or BLOCKING.

or

iii) assume the Incoming Network has restored the circuit to idle.

NOTE - A maintenance fault report may be generated to indicate the non-receipt of CIRCUIT FREE or BLOCKING.

Which of i), ii) or iii) is applied is implementation dependent, however option i) is recommended for new implementations.

In the case of options ii) or iii) the subsequent action (3.2.4.4.130 i) or ii)) is dependent on whether "local" blocking is required.

### 3.2.4.4.130

i)  If the Outgoing Network requires to invoke "local" blocking during the "repeat release" sequence a BLOCKING message shall be sent to the Incoming Network. The Blocking procedures of 3.4.2.2.2 shall then apply.

ii) If the Outgoing Network does not require to invoke "local" blocking during the "repeat release" sequence, a CIRCUIT FREE message shall be sent to the Incoming Network and the circuit shall be restored to the Idle state and allowed to be used for another call.

### 3.2.4.4.140

i)  If a CIRCUIT FREE message is received by the Outgoing Network from the Incoming Network whilst Timer TO-12a is running, the Outgoing Network shall:

a)  stop Timer TO-12a,

b)  allow the circuit to be used for another call.

ii) If a BLOCKING message is received by the Outgoing Network from the Incoming Network whilst Timer TO-12a is running, then Timer TO-12a shall be stopped and the blocking procedures of 3.4.2.2.2 shall apply.

iii) If a CIRCUIT FREE (or BLOCKING) message is not received on the expiry of Timer TO-12a the Outgoing Network shall send a further RELEASE message with Reason [47] "NULL" to the Incoming Network and restart Timer TO-12a.

### 3.2.4.4.150

i)  If a CIRCUIT FREE message is received by the Incoming Network from the Outgoing Network whilst Timer TO-12a is running, the Incoming Network shall:

a)  stop Timer TO-12a,

b)  allow the circuit to be used for another call.

ii) If a BLOCKING message is received by the Incoming Network from the Outgoing Network whilst Timer TO-12a is running, then Timer TO-12a shall be stopped and the blocking procedures of 3.4.2.2.2 shall apply.

iii) If a CIRCUIT FREE (or BLOCKING) message is not received on the expiry of Timer TO-12a the Incoming Network shall send a further RELEASE message with Reason [47] "NULL" to the Outgoing Network and restart Timer TO-12a.

## 3.2.5  Transit Network Procedures

This sub-section describes the procedures that allow the establishment of IUP calls from an Outgoing Network to an Incoming Network via a Transit Network.

For the purposes of this document, a transit network is regarded as a network that provides for the connection of calls between two other networks without performing any additional service specific functions that would require any change to the sequence or coding of any of the messages or their contents as defined in this specification.

The transit network procedures defined in this specification are applicable in all cases where the incoming route and outgoing route use IUP signalling, irrespective of whether the protocol used

within the transit network is exclusively IUP, or whether another protocol, or a variant of the IUP is used for any part of the connection within the transit network.

The Transit Network uses the normal Incoming Network and Outgoing Network call control procedures when establishing a connection between the other two Networks.

In general, fields and bits of an incoming message, considered as reserved by the Transit Network, shall be passed in the outgoing message to the preceding or succeeding network without change of value, i.e. they shall not be reset to zero as such fields and bits may be in use by more advanced networks.

NOTE - There may be fields or bits of an incoming message, considered as reserved by the Transit Network, that current implementations are unable to pass transparently in the outgoing message and are therefore set to zero.

For Call Establishment, Call Supervision procedures and Call Control Error Handling procedures, the Transit Network uses some element of the normal Incoming Network and Outgoing Network procedures, as well as carrying out Transit Network procedures.

The following overview gives the general relationship between the Transit Network procedures and the Incoming and Outgoing Networks for Call Set-up Protocols.
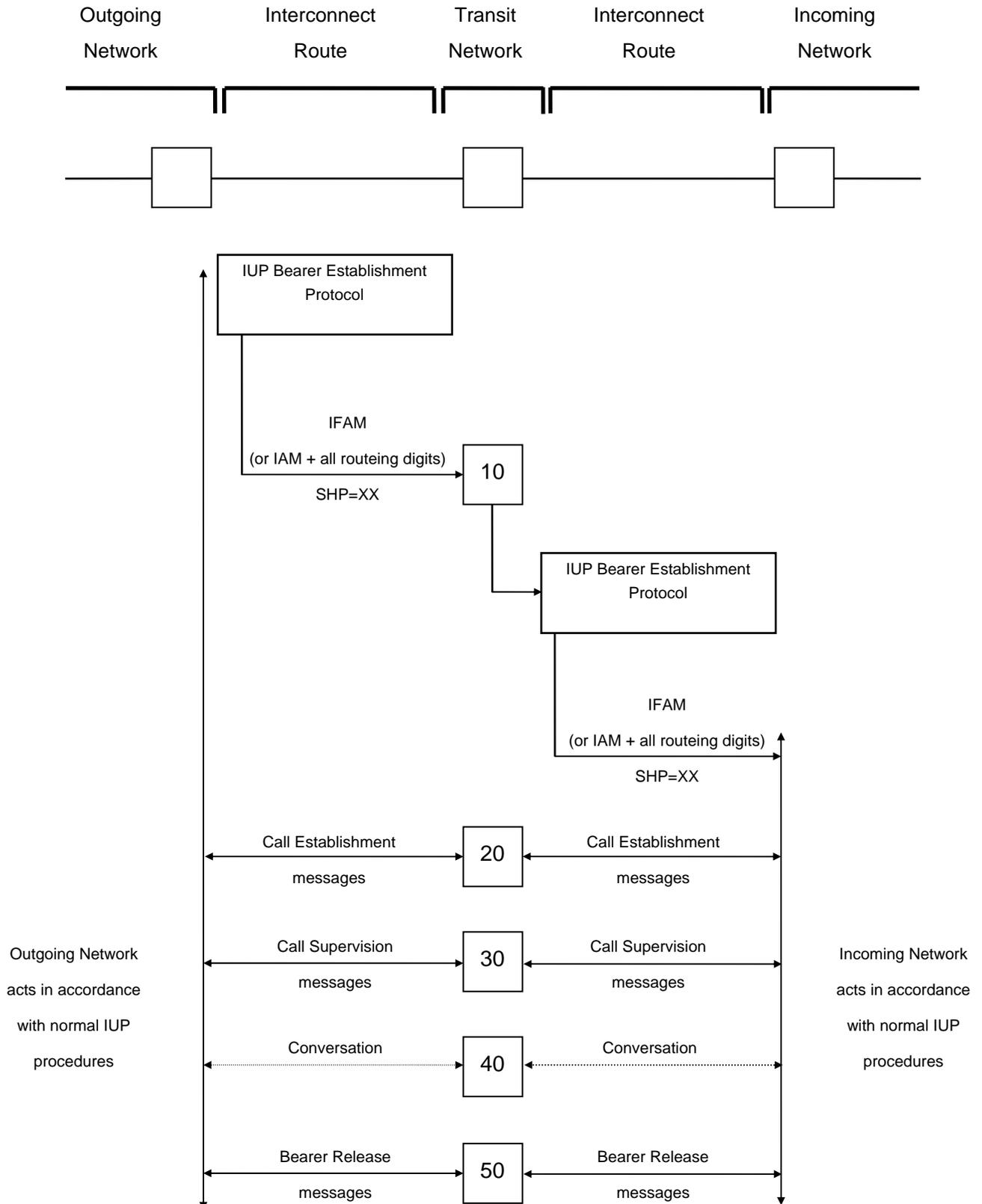


FIGURE 3.17
**Transit Network Operation**

On determining that an IUP call is required to be established, the Outgoing Network will initiate one of the Bearer Establishment Protocols as described in 3.2.1.

The IAM/IFAM will contain the SHP value appropriate to the Call Establishment Protocol requested.

### 3.2.5.1 Procedures

### 3.2.5.1.10

On receipt of an IAM/IFAM from the Outgoing Network, the Transit Network shall:

   a)   determine whether the required Call Establishment Protocol can be used on the call,

   b)   determine from the destination address that a transit function is required and identify the appropriate Incoming Network.

### 3.2.5.1.10.1

If the Transit Network requires additional information from the Outgoing Network at this point in the call then it shall use either the ACI or SASUI/ASUI Protocol described in 3.2.2.

### 3.2.5.1.10.2

If the required Call Establishment Protocol can be used the Transit Network shall:

   a)   initiate one of the Bearer Establishment Protocols to the Incoming Network as described in 3.2.1;

   b)   pass the contents of the IAM/IFAM to the Incoming Network, based on the contents of the received IAM/IFAM in accordance with the information shown in 3.2.5.2.

### 3.2.5.1.10.3

If the required Call Establishment Protocol cannot be used then the Transit Network shall reject the call by using the procedures described in 3.3.5.

### 3.2.5.1.20

The Transit Network shall pass Call Establishment messages in either direction between the Incoming and Outgoing Networks in accordance with 3.2.5.2.

### 3.2.5.1.30

When the Incoming Network and Outgoing Network have completed the Call Establishment Protocol, the call will be processed by the Incoming and Outgoing Networks in accordance with the service concerned.

### 3.2.5.1.30.1

Call Supervision messages shall be passed in either direction between the Incoming and Outgoing Networks in accordance with 3.2.5.2.

### 3.2.5.1.30.2

Call Supervision messages may also be initiated by the Transit Network and passed to the Incoming or Outgoing Network in accordance with the information shown in 3.2.5.2 using the procedures described in 3.2.3.

### 3.2.5.1.30.3

On receipt of Call Supervision messages from the Incoming or Outgoing Network, the Transit Network shall follow the rules in 3.2.5.2.

**3.2.5.1.40**

The call is in the transmission phase.

**3.2.5.1.50**

Bearer Release procedures may be initiated by the Incoming Network or Outgoing Network as described in 3.2.4 or by the Transit Network using Incoming Network and Outgoing Network procedures as described in 3.2.4.

**3.2.5.1.50.1**

If the Bearer Release Protocol is initiated by the Incoming Network then the Transit Network shall send a Release message to the Outgoing Network, to initiate the Bearer Release procedures.

The Transit Network shall continue to clear using the Incoming Network and Outgoing Network Bearer Release procedures as described in 3.2.4.

**3.2.5.1.50.2**

If the Bearer Release Protocol is initiated by the Outgoing Network then the Transit Network send a Release message to the Incoming Network, to initiate the Bearer Release procedures.

The Transit Network shall continue to clear using the Incoming Network and Outgoing Network Bearer Release procedures as described in 3.2.4.

**3.2.5.1.50.3**

If the Bearer Release Protocol is initiated by the Transit Network then the Transit Network shall use Incoming Network and Outgoing Network Bearer Release procedures as described in 3.2.4.

**3.2.5.2  Treatment of Messages, Parameters and Fields**

Shown here is the treatment of messages, parameters and fields that may be received in either direction at the Transit Network.

**3.2.5.2.1**

The purpose of Table 3.1 is to aid the reader in identifying the location of messages and parameters within Tables 3.2 to 3.4.

Within Table 3.1, the term "N/A" indicates that treatment of the message, parameter or field is not applicable to the Transit Network procedure.

TABLE 3.1
**Location of messages, parameters and fields within Tables 3.2 to 3.4**

| MESSAGE | PARAMETER | FIELD | TABLE |
|---|---|---|---|
| **All messages in Message Group 7 (Service Information Messages)** | | | 3.2 |
| ASUI | | | 3.2 |
| ACM | Message Indicators | Called Party Category | 3.2 |
| | | Charge Indicator | 3.2 |
| | | Last Party Release Indicator | 3.2 |
| | | Interworking Indicators | 3.2 |
| | | Echo Control Device Indicator | 3.3 |
| Answer Message | | | 3.2 |
| Blocking Message | | | N/A |
| Blocking Acknowledgement Message | | | N/A |
| Circuit Free Message | | | N/A |
| Clear Message | | | 3.2 |

| MESSAGE | PARAMETER | FIELD | TABLE |
|---|---|---|---|
| Coin and Fee Checking Message | | | 3.2 |
| Congestion Message | | | 3.4 |
| Connection Not Admitted Message | | | 3.2 |
| Extend Call Message | | | 3.2 |
| Final Address Message | | | 3.2 |
| Howler Message | | | 3.2 |
| Initial Address Message / Initial and Final Address Message | Message Indicators | Calling Party Category | 3.2 |
| | | Calling Line Identity Indicator | 3.3 |
| | | CLI Blocking Indicator | 3.3 |
| | | International Indicator | 3.2 |
| | | Interworking Indicator | 3.2 |
| | | Priority Access Indicator | 3.2 |
| | | Meter Delay Guard Timeout Indicator | 3.2 |
| | | Protection Indicator | 3.2 |
| | | Service Handling Protocol | 3.2 |
| | | Release Protocol Indicator | 3.3 |
| | | Long Propagation Delay Indicator | 3.3 |
| | | Call Type Indicator | 3.2 |
| | | Echo Control Device Indicator | 3.3 |
| | | Network Translated Address Indicator | 3.2 |
| | | Interconnect Specific Information | 3.4 |
| | | Routeing Control Indicator | 3.4 |
| | | Call Path Indicator | 3.2 |
| | | Presentation Number Indicator | 3.2 |
| | Called Address | | 3.2 |
| | Line Identity | | 3.2 |
| Operator Override Message | | | 3.2 |
| Overload Message | | | 3.4 |
| Re-Answer Message | | | 3.2 |
| Release Message | | | 3.3 |
| Repeat Attempt Message | | | 3.4 |
| Send Additional Set-up Information Message | | | 3.2 |
| Send All Digits Message | | | 3.2 |
| Send N Digits Message | | | 3.2 |
| Sub Engaged Message | | | 3.3 |
| Sub Out-of-Order Message | | | 3.3 |
| Subsequent Address Message | | | 3.2 |
| Terminal Congestion Message | | | 3.3 |
| Unblocking Message | | | N/A |
| Unblocking Acknowledgement Message | | | N/A |

**3.2.5.2.2**

Table 3.2 shows in bold text the signalling information which shall be passed transparently by the Transit Network, between the Incoming and Outgoing Networks, where the signalling information sent shall be the same as the signalling information received.

TABLE 3.2
**Signalling information which shall be passed transparently by the Transit Network**

| Message | Parameter | Field |
|---|---|---|

| Message | Parameter | Field |
|---|---|---|
| **All messages in Message Group 7 (Service Information Messages)** | (see Note 3) | |
| IAM/IFAM | Message Indicators | **Calling Party Category** |
| IAM/IFAM | Message Indicators | **International Indicator** |
| IAM/IFAM | Message Indicators | **Interworking Indicator** |
| IAM/IFAM | Message Indicators | **Priority Access Indicator** |
| IAM/IFAM | Message Indicators | **Meter Delay Guard Timeout Indicator** |
| IAM/IFAM | Message Indicators | **Protection Indicator** |
| IAM/IFAM | Message Indicators | **Call Type Indicator** |
| IAM/IFAM | Message Indicators | **Network Translated Address Indicator** |
| IAM/IFAM | Message Indicators | **Service Handling Protocol Indicator** |
| IAM/IFAM | Message Indicators | **Call Path Indicator** |
| IAM/IFAM | Message Indicators | **Presentation Number Indicator** |
| IAM/IFAM | Called Address | **Number of Called Address Signals** (see Note 1) |
| IAM/IFAM | Called Address | **Address Signals** ( + Filler if appropriate ) (see Note 1) |
| IAM/IFAM | **Line Identity** (see Note 2) | |
| **FAM** | | (see Note 1) |
| **SND** | | (see Note 1) |
| **SAM** | | (see Note 1) |
| **ASUI** | | |
| **SASUI** | | |
| **SAD** | | |
| **CNA** | (see Note 4) | |
| ACM | Message Indicators | **Called Party Category** |
| | | **Charge Indicator** |
| | | **Last Party Release Indicator** |
| | | **Interworking Indicators** |
| **ANS** | | |
| **CLR** | | |
| **RAN** | | |
| **CFC** | | |
| **ECM** | | |
| **HLR** | | |
| **OOR** | | |

NOTE 1 -  It is possible that the interconnect route between the Outgoing Network and the Transit Network uses en-bloc signalling whilst the interconnect route between the Transit Network and the Incoming Network uses overlap signalling, and vice versa. Also, if both interconnect routes use overlap signalling, it is possible that the length and/or content of each message received will not be duplicated in corresponding messages sent. In these situations the complete information shall be determined from the concatenation of the messages sent.

NOTE 2 -  Some existing implementations discard the optional IAM/IFAM Line Identity parameter.

NOTE 3 -  Some existing implementations discard the optional Confusion Message Qualifier parameter in the Confusion message.

NOTE 4 -  Some existing implementations do not pass the CNA Diagnostic parameter transparently.

SEE PAGE 2 FOR THE NORMATIVE INFORMATION

**3.2.5.2.3**

Table 3.3 shows in bold text the signalling information which, if present, shall be handled by the Transit Network according to the rules indicated then passed to the Incoming Network.

TABLE 3.3
**Signalling information which, if present, shall be handled by the Transit Network according to the rules indicated**

| Message | Parameter | Field |
|---------|-----------|-------|
| IAM/IFAM | Message Indicators | **CLI Blocking Indicator** ( see 3.2.5.2.3.1 ) |
| IAM/IFAM | Message Indicators | **Release Protocol Indicator** ( see 3.2.5.2.3.2 ) |
| IAM/IFAM | Message Indicators | **Long Propagation Delay Indicator** ( see 3.2.5.2.3.3 ) |
| IAM/IFAM | Message Indicators | **Echo Control Device Indicator** (see 3.2.5.2.3.4) |
| IAM/IFAM | Message Indicators | **Calling Line Identity Indicator** (see 3.2.5.2.3.6) |
| ACM | Message Indicators | **Echo Control Device Indicator** (see 3.2.5.2.3.5) |
| **REL** | | (see 3.2.5.2.3.7) |
| **SEM** | | (see 3.2.5.2.3.8) |
| **SOO** | | (see 3.2.5.2.3.9) |
| **TCM** | | (see 3.2.5.2.3.10) |

**3.2.5.2.3.1 IAM/IFAM Message Indicators CLI Blocking Indicator**

The CLI Blocking Indicator field value shall be processed to ensure compliance with 0.

**3.2.5.2.3.2 IAM/IFAM Message Indicators Release Protocol Indicator**

The Release Protocol Indicator field value shall be processed and the value appropriate to the Transit Network shall be sent to the Incoming Network.

**3.2.5.2.3.3 IAM/IFAM Message Indicators Long Propagation Delay Indicator**

The Long Propagation Delay Indicator field value shall be processed as follows:

  i)    if the value received is 1, then value 1 shall be sent to the Incoming Network,

  ii)   if the value received is 0 and the Transit Network does not include a long propagation circuit (either within the Transit Network or on the interconnect between the Transit Network and the Incoming Network), then value 0 shall be sent to the Incoming Network,

  iii)  if the value received is 0 and the Transit Network includes a long propagation circuit (either within the Transit Network or on the interconnect between the Transit Network and the Incoming Network), then value 1 shall be sent to the Incoming Network.

**3.2.5.2.3.4 IAM/IFAM Message Indicators Echo Control Device Indicator**

The Echo Control Device Indicator field value shall be processed as follows:

  i)    if the value received is 1 then the Transit Network shall:

    a)    disable any outgoing half echo canceller device in the Transit Network,

    b)    send value 1 to the Incoming Network.

  ii)   if the value received is 0 and the Transit Network includes an outgoing half echo canceller device, then the Transit Network shall:

    a)    reserve an incoming half echo canceller device,

    b)    send value 1 to the Incoming Network.

  iii)  if the value received is 0 and the Transit Network does not include an outgoing half echo canceller device then the Transit Network shall send value 0 to the Incoming Network.

### 3.2.5.2.3.5 ACM Message Indicator Echo Control Device Indicator

The Echo Control Device Indicator field value shall be processed as follows:

i) if the value received is 1 then the Transit Network shall:

    a) release any reserved incoming half echo canceller device,

    b) send value 1 to the Outgoing Network.

ii) if the value received is 0 and the Transit Network has not reserved an incoming half echo canceller device then the Transit Network shall send value 0 to the Outgoing Network.

iii) if the value received is 0 and the Transit Network has reserved an incoming half echo canceller device then the Transit Network shall:

    a) include the incoming half echo canceller device,

    b) send value 1 to the Outgoing Network.

### 3.2.5.2.3.6 IAM/IFAM Message Indicators Calling Line Identity Indicator

The CLI indicator field value shall be processed to indicate the presence or otherwise of the Line Identity parameter in the IAM/IFAM.

### 3.2.5.2.3.7 Initial REL

### 3.2.5.2.3.7.1 Initial REL received in the forward direction

The initial REL message shall be passed on unchanged by the Transit Network.

### 3.2.5.2.3.7.2 Initial REL received in the backward direction, post-ACM

The initial REL message shall be passed on unchanged by the Transit Network.

### 3.2.5.2.3.7.3 Initial REL received in the backward direction, pre-ACM

i) If the RPI received from the Outgoing Network is set to 1, and the RPI value sent to the Incoming Network is set to 1, then the initial REL message shall be passed on unchanged by the Transit Network.

ii) If the RPI received from the Outgoing Network is set to 1, and the RPI value sent to the Incoming Network is set to 0, then the Transit Network shall either pass on the initial REL message unchanged, or send a CNA message to the Outgoing Network with reason derived from the received REL message.

iii) If the RPI received from the Outgoing Network is set to 0, and the RPI value sent to the Incoming Network is set to 0, then the Transit Network shall send a CNA message to the Outgoing Network, with reason derived from the received REL message.

iv) If the RPI received from the Outgoing Network is set to 0, and the RPI value sent to the Incoming Network is set to 1, then the Transit Network shall send a CNA message to the Outgoing Network, with reason derived from the received REL message.

### 3.2.5.2.3.8 SEM

Upon receipt of a Subscriber Engaged Message from the Incoming Network the Transit Network shall either:

i) send CNA with reason "Subscriber Engaged" [8] to the Outgoing Network; or

ii) send the Subscriber Engaged Message to the Outgoing Network (see note).

NOTE - The preferred alternative is the sending of the CNA as described in (i)

### 3.2.5.2.3.9  SOO

Upon receipt of a Subscriber Out of Order message from the Incoming Network the Transit Network shall either:

i)    send CNA with reason "Subscriber Out of Order" [9] to the Outgoing Network; or

ii)   send the Subscriber Out of Order message to the Outgoing Network (see note).

NOTE -    The preferred alternative is the sending of the CNA as described in (i)

### 3.2.5.2.3.10  TCM

Upon receipt of a Terminal Congestion Message from the Incoming Network the Transit Network shall either:

i) send CNA with reason "Congestion, rerouteing not permitted" [7] to the Outgoing Network;

or

ii) send the Terminal Congestion Message to the Outgoing Network (see note).

NOTE - The preferred alternative is the sending of the CNA as described in (i)

### 3.2.5.2.4

Table 3.4 shows in bold text the signalling information that is only applicable on a link-by-link basis and shall require no treatment that is specific to a Transit Network.

TABLE 3.4
**Signalling information which shall be handled on a link-by-link basis**

| Message | Parameter | Field |
|---|---|---|
| IAM/IFAM | Message indicators | **Interconnect Specific Information** (see note) |
| IAM/IFAM | Message Indicators | **Routeing Control Indicator** |
| **CNG** | | |
| **OLM** | | |
| **RAM** | | |

NOTE -    Some existing implementations pass this transparently.

## 3.2.6  Treatment of Reserved Fields and Values

### 3.2.6.1  Reserved Parameter Fields

Irrespective of the coded value and unless indicated otherwise in this specification, reserved parameter fields shall be ignored.

### 3.2.6.2  Reserved parameter field values

Reserved parameter field values shall be interpreted as value 0 unless otherwise specified in this specification.

### 3.2.6.2.1  Address Complete Message Indicators (see 2.4.7)

**b) Charge Indicator**
The Charge Indicator field should be set to value 1 - charge - If value 0 is received then it should be interpreted as value 1.

**d) Interworking Indicator**
Indicating the nature of signalling system and transmission path that has been encountered within the interconnected networks.

| 00011 [3] | ) | reserved - in the originating network, if a SIM interchange has |
| to | ) | occurred, interpret as Value 1; if a SIM interchange has not |
| 01111 [15] | ) | occurred, interpret as Value 2. |

| 10000 [16] | | reserved - interpret as value 0 |

| 10011 [19] | ) | reserved - in the originating network, if a SIM interchange has |
| to | ) | occurred, interpret as Value 17; if a SIM interchange has not |
| 11111 [31] | ) | occurred, interpret as Value 18. |

A network shall not initiate any action to fail a call on receipt of unrecognised interworking indicator values.

### 3.2.6.2.2  ASUI Message - Information Contained parameter (see 2.4.8)

The Information Contained parameter should only be set to values 1 or 2. If other values are received the message shall be discarded.

### 3.2.6.2.3  Called Address (see 2.4.9)

#### a) Number of Called Address Signals
The receipt of an invalid length indication shall initiate clear down in accordance with the procedures described in subsection 3.2.3.1 with either reason [34] "Protocol Violation" or reason [02] "Network Termination". It is recommended that new implementations of IUP use reason [34] "Protocol Violation".

NOTE – A maintenance fault report should be generated to indicate that an invalid length indicator has been received.

#### b) Address Signals
The receipt of any Invalid Address Signal value shall initiate clear down in accordance with the procedures described in subsection 3.2.3.1 with either reason [34] "Protocol Violation" or reason [02] "Network Termination".

NOTE - It is recommended that new implementations of IUP use reason [34] "Protocol Violation".

#### c) Filler
This field shall be ignored on receipt.

### 3.2.6.2.4  IAM/IFAM message indicators (see 2.4.16)

#### d) Service Handling Protocol (SHP)
The receipt of an Invalid Service Handling Protocol value shall initiate clear down in accordance with the procedures described in subsection 3.2.3.1 with reason [03] "Service Unavailable".

#### f) Interconnect Specific Information - (ISI)
The rules for handling this field shall be as specified for reserved fields.

### 3.2.6.2.5  ISDN Composite SIM Facility Indicator Code parameter field (see 2.4.17)

| (msb) | (lsb) | |
| --- | --- | --- |
| 00000000 00000001 [1] | | reserved - Confusion shall be returned |

| 00000000 00000111 [7] | ) | |
| to | ) | reserved - Confusion shall be returned |
| 11111111 11111111 [65535] | ) | |

### 3.2.6.2.6 ISDN Composite SIM - Information Contained/Information Requested (see 2.4.18)

00001000 [8]    )
    to         )  reserved - Confusion shall be returned
11111111 [255]  )

If an invalid IRC/ICC combination is received a Confusion message shall be returned.

### 3.2.6.2.7 Line Identity (see 2.4.19)

#### a) Message Indicators
BA - Nature of Address Indicator (NAI)

On receipt of any reserved value the LI parameter shall be ignored. Some existing implementations interpret all reserved values as 10 [2].

### 3.2.6.2.8 Release Reason (see 2.4.24)

If the Release Reason is not recognised by the receiving network, then the receiving network shall interpret it as code 47.

### 3.2.6.2.9 SASUI Message - Information Indicator parameter (see 2.4.25)

Messages received with an Information Indicator value other than "00000001" shall be ignored.

### 3.2.6.2.10 Send N Digits Message - Number of Digits Requested parameter (see 2.4.26)

The receipt of value "0000" shall cause the initiation of clear down in accordance with the procedures described in subsection 3.2.4 by sending a forward Release message with either reason [34] "Protocol Violation" or reason [02] "Network Termination", and an incident report shall be given.

NOTE - It is recommended that new implementations of IUP use reason [34] "Protocol Violation".

### 3.2.6.2.11 Six Character Network Address Extension (Sub-Address) (see 2.4.29)

#### a) NAE Character Count
The receipt of a reserved NAE Character Count value shall result in a Confusion message being returned.

### 3.2.6.2.12 Type of Answer (see 2.4.30)

0010 [2]     )

to          )  reserved - interpret as "0001"

1111 [15]    )

## 3.3 Call Control Error Handling Procedures

This sub-section describes the default error handling procedures associated with C7 IUP messages. These requirements shall apply in the absence of procedures described elsewhere in this specification. These requirements represent a basic core of procedures that are relevant to any IUP Interconnect. They are not invoked by specific IUP service sections.

Two basic forms of error condition can be identified:

- faulty messages, these include; receipt of unrecognised messages, parameter values and undersize/oversize messages, or messages containing an unallocated Circuit Identification Code, (CIC), see 3.3.1.1,

- unexpected messages, i.e. recognised and correctly formatted messages received in the wrong call state or in the wrong direction, see 3.3.1.2.

NOTE - Message Group 7 includes a Confusion message to support error handling within this group only; therefore the error procedures appropriate to this message group are described separately in 3.3.4.

### 3.3.1 Definitions of Faulty and Unexpected Messages

### 3.3.1.1 Faulty Messages

a) Unrecognised Messages

A message is considered as "unrecognised" if:

i) the message is short i.e. the H0 and H1 codes are not received and by inference nothing follows the H0/H1 field, or

ii) the H0 and H1 combination received is not specified in this issue of the specification (see Table 2.1), or

NOTE - H0/H1 combinations shown as "unallocated" may be assigned by the ISC in advance of being published for services in this specification or 0. Under these circumstances a receiving network may recognise a message not appearing in this specification.

iii) the H0 and H1 combination received is indicated as unavailable for ISC allocation in Table 2.1, or

iv) the H0 and H1 combination received is specific to a service(s) that is not supported by the receiving network.

b) Unrecognised Parameter Field Values

A parameter field value is considered as unrecognised if:

i) The value is shown as "Reserved" in this Specification, (but see Note below), or

ii) The value is for use in a service not supported by a receiving network, or

iii) A message is received containing an unallocated CIC value.

NOTE - Parameter field values shown as "reserved" may be assigned by the ISC in advance of being published or for services in 0. Under these circumstances the receiving networks may recognise a value not appearing in this Specification.

c) Undersize messages

A message is considered to be undersize if the number of octets is less than the permitted minimum specified for that type as shown in section 2.

d) Oversize messages

A message is considered to be oversize if the number of octets is more than the permitted maximum specified for that type as shown in section 2.

NOTE - A message format error can only be detected when the message is recognised as a result of examination of the received H0 and H1 Header Codes.

### 3.3.1.2 Unexpected Messages

A recognised message is considered as "unexpected" if:

  i)   it is received in a call state when it is not valid, or

  ii)  it is received in the forward direction when it is valid only in the backward direction, or

  iii) it is received in the backward direction when it is valid only in the forward direction,

> NOTE - A RELEASE message is valid in all call states except Idle

### 3.3.2 Procedures for Handling Receipt of Faulty Messages

### 3.3.2.1 Unrecognised Messages

Unrecognised messages other than those in Group 7 shall be ignored and discarded. For messages in Group 7 see 3.3.4.

### 3.3.2.2 Unrecognised Parameter Field Values

The action on receipt of an unrecognised parameter field value shall be as for a reserved value and is given against the parameter field value concerned, in subsection 3.2.6.

Additionally, any message received containing an unallocated CIC shall be discarded.

### 3.3.2.3 Undersize message

Any undersize message received shall be ignored and discarded.

### 3.3.2.4 Oversize message

Any oversize message received may be truncated and the additional octets ignored. The remainder of the message shall be processed normally.

### 3.3.3 Handling of Unexpected Non Group 7 Messages

### 3.3.3.1 During any call state other than idle

If an unexpected message is received, in any call state other than idle, the message shall be ignored and discarded and the protocol/call shall continue.

> NOTE - Certain existing implementations may clear the call under these circumstances by sending a RELEASE message containing reason [34] "Protocol Violation".

### 3.3.3.2 During idle state

With the exception of the requirements indicated below, on receipt of an unexpected message in the idle state it shall be ignored and discarded and the circuit shall remain idle.

### 3.3.3.2.1 Incoming Unidirectional Circuit

If a RELEASE message containing any REASON value is received in the idle state by the Incoming Network (i.e. the network to which, under normal call conditions, the called customer is connected) it shall be acknowledged with a CIRCUIT FREE message and the circuit shall remain idle.

### 3.3.3.2.2 Outgoing Unidirectional Circuit

  i)   If a RELEASE message containing any REASON value is received in the idle state by the Outgoing Network (i.e. the network to which, under normal call conditions, the calling customer is connected) it shall be acknowledged with a RELEASE message containing reason [47] "Null". From then on the normal Unidirectional circuit release procedures of 3.2.4.1 or 3.2.4.3 shall apply as appropriate.

ii)   If an UNBLOCKING message is received in the idle unblocked state it shall be acknowledged with an UNBLOCKING ACKNOWLEDGEMENT message and the circuit shall remain idle.

### 3.3.3.2.3 Bothway Circuit

### 3.3.3.2.3.1 Receipt of a RELEASE message

The following procedures provide guidance for new implementations. Existing implementations might use different methods.

The receipt of a RELEASE message in the idle state on a bothway circuit invokes an "Idle Release Sequence" designed to prevent a continuous interaction of RELEASE and CIRCUIT FREE messages between networks.

The interaction is prevented by only acting upon a Release message if it is received twice. The mechanism for achieving this is described here by the use of an "Idle Release Flag" which is stored within a network.

### 3.3.3.2.3.1.1 Idle Release Flag set to "0"

If a RELEASE message containing any REASON value is received in the idle state and the Idle Release Flag is currently set to "0", then the receiving network shall:

a)   Set the Idle Release Flag to "1"

b)   Remain in the Idle state

NOTE -   The Idle Release Flag shall remain set to "1" until the circuit is used for a new call, in either direction, or if the actions described in 3.3.3.2.3.1.2 are taken.

### 3.3.3.2.3.1.2 Idle Release Flag set to "1"

If a RELEASE message containing any REASON value is received in the idle state and the Idle Release Flag is currently set to "1", then the receiving network shall:

a)   Send a RELEASE message containing reason [47] "Null",

b)   Send a CIRCUIT FREE message,

c)   Set the Idle Release Flag to "0",

d)   Remain in the idle state.

If a CIRCUIT FREE message is received in the idle state and the Idle Release Flag is currently set to "1", then the receiving network shall:

a)   Send a CIRCUIT FREE message

b)   Set the Idle Release Flag to "0"

c)   Remain in the idle state

### 3.3.3.2.3.2 Receipt of an UNBLOCKING message

If an UNBLOCKING message is received in the idle unblocked state it shall be acknowledged with an UNBLOCKING ACKNOWLEDGEMENT message and the circuit shall remain idle.

### 3.3.3.2.3.3 Receipt of a BLOCKING message

If a BLOCKING message is received in the idle remotely blocked state it shall be acknowledged with a BLOCKING ACKNOWLEDGEMENT message and the circuit shall remain idle remotely blocked.

### 3.3.4 Group 7 Messages - Confusion Message Procedures

Message Group 7 includes a CONFUSION message to deal with Group 7 message error handling and forward compatibility problems. The following procedures defining the use of the CONFUSION message refer ONLY to receipt of messages within that message group.

The actions taken by the receiving network on receipt of a CONFUSION message will be dependent on the service concerned.

A CONFUSION message shall NEVER be sent in response to a received CONFUSION message.

#### 3.3.4.1 Handling of Unexpected Group 7 Messages

On receipt of an unexpected Group 7 message as defined in 3.3.1.2 above, in any call state except idle, a CONFUSION message shall be returned and the call shall remain in the same state.

Any Group 7 message received in the idle state shall be ignored and discarded and the circuit shall remain idle.

Any ACI message received in any call state at a network that had previously set the Interworking Indicator in the IAM/IFAM shall be ignored.

#### 3.3.4.2 Handling of Unrecognised Group 7 Messages

On receipt of an unrecognised Group 7 message received in any call state except idle, a CONFUSION message shall be returned and the call shall remain in the same state.

#### 3.3.4.3 Handling of Unrecognised Group 7 Message Parameters and Parameter Fields

New parameters or parameter fields may be added to currently defined Group 7 messages by prior agreement of the ISC by using a mandatory message field or parameter field previously defined as reserved within the Group 7 message concerned.

A network not supporting new parameters shall ignore the contents of message fields and parameter fields designated as "reserved" in this issue of the Specification and call set-up shall continue. Alternatively, a CONFUSION message may be returned and the call remain in the same state.

#### 3.3.4.4 Handling of Unrecognised Group 7 Message Parameter Field Values

The action required of the receiving network on receipt of an unrecognised parameter field value is given against the parameter field value concerned in Sub-section 3.2.6.

### 3.3.5 Unsupported SHP/CPI Combinations

If an IAM/IFAM is received with an SHP/CPI combination that does not relate to a supported service between the networks concerned the call shall be rejected with CNA/RELEASE reason [03] "Service Unavailable".

## 3.4  Circuit Blocking/Unblocking Procedures

The network which applies blocking (i.e. sends a BLOCKING message to the other network) will consider the circuit concerned to be "locally" blocked.

A "locally" blocked circuit is one that will not accept incoming call requests (but in the case of bothway circuits may still initiate calls). If an IAM/IFAM is received relating to a locally blocked circuit then the circuit is re-blocked in accordance with 3.4.1.10 and the IAM/IFAM discarded.

The network that receives the blocking message/notification will consider the circuit concerned to be "remotely" blocked.

A "remotely" blocked circuit shall not be used to initiate call requests (but in the case of a bothway circuit an incoming call request relating to it shall be accepted).

### 3.4.1 Unidirectional/Bothway Circuit (idle state) - Blocking and Unblocking Procedures

| NETWORK A | INTERCONNECT ROUTE | NETWORK B |
|---|---|---|

C7 IUP

IDLE UNBLOCKED

**20** ← BLOCKING **10**

BLOCKING ACK. → **30**

[Remotely blocked] BLOCKED [Locally blocked]

**50** ← UNBLOCKING **40**

UNBLOCKING ACK. → **60**

[Idle Unblocked] UNBLOCKED [Idle unblocked]
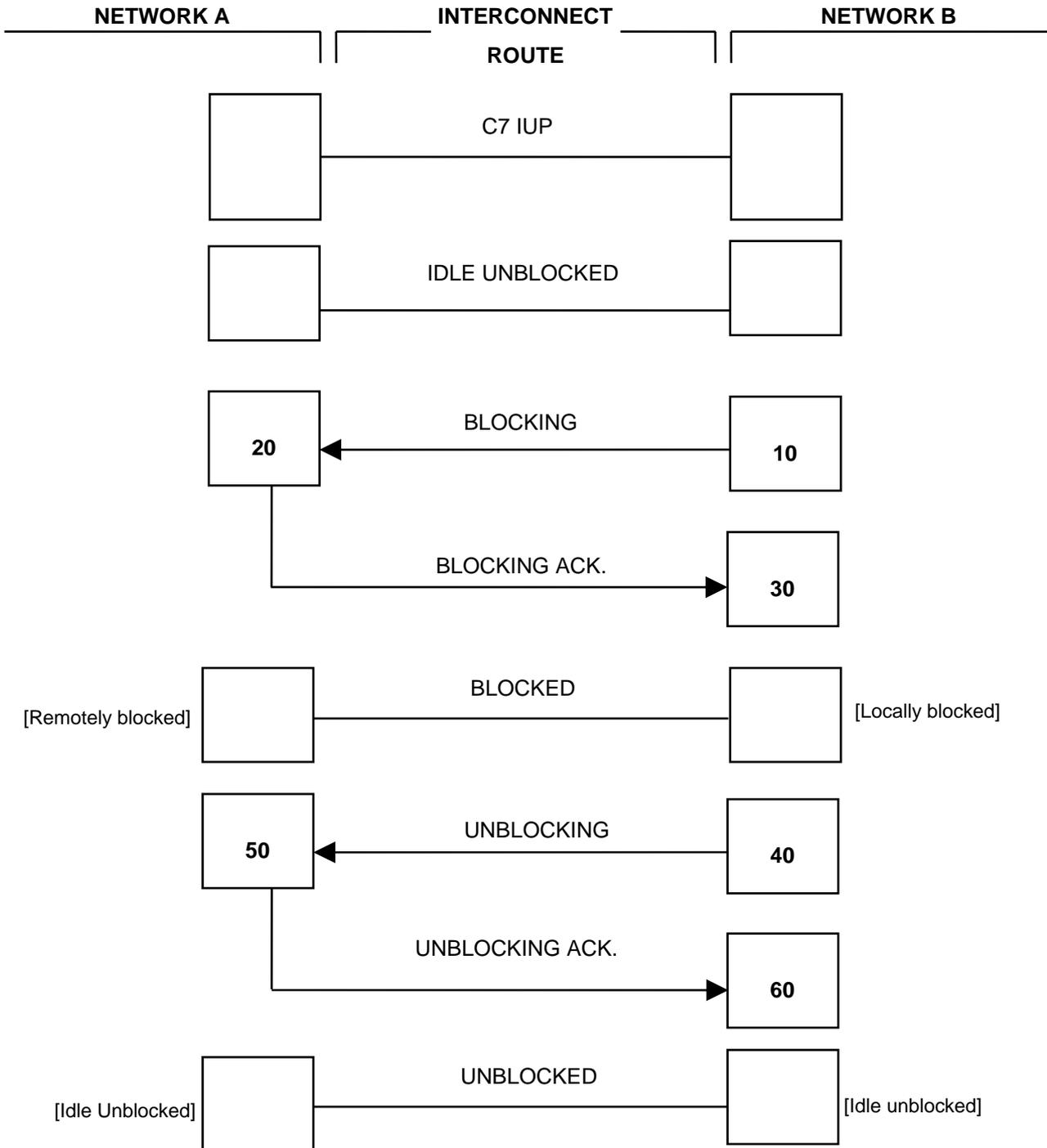
FIGURE 3.18
**Blocking/Unblocking - Idle State**

### 3.4.1.10

When the circuit is in the Idle state and Network B wishes to inhibit Incoming call attempts from Network A, the Network B shall:

a) send a BLOCKING message to Network A,

b) start Timer TO-08 for receipt of a BLOCKING ACKNOWLEDGEMENT message,

c) ignore any IAM/IFAM received from Network A subsequent to sending the BLOCKING message and prior to receipt of BLOCKING ACKNOWLEDGE,

d) if Timer TO-08 matures Network B shall send a second BLOCKING message to Network A and restart Timer TO-08,

e) if Timer TO-08 matures for the second time Network B shall send a third BLOCKING message to Network A and again restart TO-08,

f) if Timer TO-08 matures [for the third time] then Network B shall enter a locally blocked idle state.

### 3.4.1.20

When the Circuit is in the idle state, on receipt of a BLOCKING message from Network B, Network A shall:

a) mark the circuit as "remotely" blocked, i.e. unavailable for selection for Outgoing call attempts to Network B,

b) send a BLOCKING ACKNOWLEDGEMENT message to Network B.

### 3.4.1.30

On receipt of a BLOCKING ACKNOWLEDGEMENT message from Network A, Network B shall:

a) mark the circuit as locally blocked,

b) stop Timer TO-08.

### 3.4.1.40

When Network B wishes to restore the circuit to service Network B shall:

a) send an UNBLOCKING message to Network A,

b) start Timer TO-08 awaiting an UNBLOCKING ACKNOWLEDGEMENT message,

c) if Timer TO-08 matures Network B shall send a second UNBLOCKING message to Network A and restart Timer TO-08,

d) if Timer TO-08 matures for the second time Network B shall send a third UNBLOCKING message to Network A and again restart Timer TO-08,

e) if Timer TO-08 matures [for the third time] then Network B shall either:

   i) start Timer TO-08a, and continue as described in 3.4.1.70.

   NOTE - A maintenance fault report should be generated to indicate the non-receipt of Unblocking Acknowledgement.

   or

   ii) remove local blocking and accept call requests from Network A by entering the Idle Unblocked state.

   NOTE - Which of i) or ii) is applied is implementation dependent; however option i) is recommended for new implementations.

**3.4.1.50**

On receipt of an UNBLOCKING message, Network A shall:

   a)   remove the remotely blocked marking,

   b)   send an UNBLOCKING ACKNOWLEDGEMENT message to Network B.


**3.4.1.60**

On receipt of an UNBLOCKING ACKNOWLEDGEMENT message from Network A, Network B shall:

   a)   cancel Timer TO-08,

   b)   remove the locally blocked marking.


**3.4.1.70**

   i)   If an UNBLOCKING ACKNOWLEDGEMENT message is received by Network B from Network A whilst Timer TO-08a is running, Network B shall:

      a)   cancel Timer TO-08a,

      b)   remove the locally blocked marking.

   ii)   If an UNBLOCKING ACKNOWLEDGEMENT message is not received on the expiry of Timer TO-08a Network B shall send a further UNBLOCKING message to Network A and restart Timer TO-08a.

## 3.4.2  Blocking (during release) Procedures

### 3.4.2.1  Blocking (during release) - Unidirectional Circuits

The normal release initiation procedures of 3.2.4.1 and 3.2.4.3 apply as appropriate with the exception that the Incoming Network, in order to prevent calls from the Outgoing Network, shall send a BLOCKING message in place of the CCT FREE message. The timer events of 3.2.4.1 and 3.2.4.3 still apply.

The Incoming Network, on sending of BLOCKING, shall mark the circuit as locally blocked (refer to 3.4.1). The Outgoing Network, on receipt of BLOCKING, shall mark the circuit as remotely blocked.

### 3.4.2.2  Blocking (during release) - Bothway Circuits

### 3.4.2.2.1  Release initiated by Outgoing Network

The normal release initiation procedures of 3.2.4.2 apply. Where either network requires to prevent incoming calls from the other network it shall send a BLOCKING message in place of the CCT FREE message. The timer events of 3.2.4.2 still apply.

Each network, on sending of BLOCKING, shall mark the circuit as locally blocked (refer to 3.4.1). Each network, on receipt of BLOCKING, shall mark the circuit as remotely blocked.

### 3.4.2.2.2  Release initiated by Incoming Network

The normal release initiation procedures of 3.2.4.4 apply. Where either network requires to prevent incoming calls from the other network it shall send a BLOCKING message in place of the CCT FREE message. The timer events of 3.2.4.4 still apply.

Each network, on sending of BLOCKING, shall mark the circuit as locally blocked (refer to 3.4.1). Each network, on receipt of BLOCKING, shall mark the circuit as remotely blocked.

## 3.5  MTP INTERACTIONS

This sub-section describes the procedures for interacting with the C7 Message Transfer Part (MTP) under MTP and User Part failure and MTP congestion conditions. Other information on MTP operation is available in PNO-ISC/INFO/007 /19/.

### 3.5.1 Signalling Relation Management

#### 3.5.1.1

Complete failures in the Message Transfer Part /9/ may cause some signalling points in the signalling network to become unavailable. This will be notified to IUP by the MTP in the form of the MTP primitive "MTP Pause". When it is possible to recommence signalling to the same destination i.e. signalling point, then this will be notified to IUP in the form of the MTP primitive "MTP Resume".

#### 3.5.1.2

If an "MTP Pause" is received for a particular destination, then IUP shall cease sending messages to that destination. IUP may recommence generating messages when "MTP Resume" is received.

#### 3.5.1.3

MTP has the capability to detect when it is unable to deliver messages to a distant user part and notifies the local user part in the MTP primitive "MTP Status, user part unavailability". However, MTP does not notify the local user part when the remote user part becomes available again (Q.701 section 8.4 refers).

#### 3.5.1.4

If a user part responds to the MTP primitive "MTP Status – user part unavailability" then the user part shall take steps to ensure that traffic is re-started by itself detecting that the distant user part is available again.

### 3.5.2 Message Flow Control

IUP will be notified by the MTP of signalling network congestion towards a particular destination signalling point in the form of the MTP primitive "MTP Status - congestion". The MTP Status primitive will indicate one of three levels of congestion and the IUP shall take the actions to reduce the traffic to that destination. An example of such actions, which has already been used by a number of implementations, is described in 3.5.2.1 and 3.5.2.2 below.  Other appropriate actions may also be considered.

#### 3.5.2.1   Reduction of traffic

#### 3.5.2.1.1

When IUP receives the MTP Status – congestion primitive it shall, while the state of congestion exists, reduce the number of signalling messages to the congested destination as follows:

**Level 1**

a) Continue to service all emergency or priority calls (i.e. calls with the protection indicator or operator priority access indicator set).

b) Reject incoming and cease sending outgoing IAMs and IFAMs with certain CPC/ISI combinations, as agreed bi-laterally.

c) Continue to service all subsequent messages for calls that are already established or are in the call set-up phase.

**Level 2**

a) Continue to service all emergency or priority calls (i.e. calls with the protection indicator or operator priority access indicator set).

b) Reject incoming and cease sending outgoing IAMs and IFAMs.

c) Continue to service all subsequent messages for calls that are already established or are in the call set-up phase.

**Level 3**

a) Reject incoming and cease sending outgoing IAMs and IFAMs.

b) Continue to service all subsequent messages for calls that are already established or are in the call set-up phase.

**3.5.2.1.2**

If a new outgoing call is rejected due to message flow control (i.e. MTP congested destination), it shall be treated as if telephony route congestion had been encountered.

Note: in some circumstances alternative routeing may not be appropriate, dependent on the location of the congestion.

**3.5.2.1.3**

If a new incoming call is rejected due to message flow control (i.e. MTP congested destination) an appropriate IUP message shall be sent to the originating node.

**3.5.2.2  Restoration of Traffic**

**3.5.2.2.1**

Because MTP does not notify its user parts of abatement of congestion, IUP shall determine itself that congestion has abated, consequently when IUP first receives notification of signalling network congestion, it shall start a nominal 1-second timer.

Note: Some operators consider a timer value of 5 seconds more appropriate.

### 3.5.2.2.2

Whenever IUP receives subsequent notifications of congestion a check shall be made:

      i)     if the new level is lower than the locally stored congestion status, then the notification shall be ignored,

      ii)    if the new level is the same as the locally stored congestion status, then the timer shall be re-started,

      iii)   if the new level is higher than the locally stored congestion status, then the level shall be reset to the new level and the timer re-started.

### 3.5.2.2.3

If the timer expires the locally stored congestion status shall be decremented by 1 and, if following such action the locally stored congestion status level is not 0 (i.e. congestion status = congestion), then the timer shall be re-started.

### 3.5.2.2.4

If the timer expires and is not re-started, then IUP shall assume that signalling congestion to that destination has abated and shall resume normal traffic handling for that destination.

## 3.6  Timer Table

The C7 IUP Timer requirements are given in the following table. The recommended settings are indicated in the "VALUE" column. Timer tolerances shall be +25%, -0%.

NOTE - Because this specification cannot distinguish nodes in either Incoming or Outgoing Networks, it is not possible to give other than general guidance regarding specific nodal timer events.

NOTE - only Timers TO-01, 02, 03, 04, 05, 06, 08, 08a, 09, 10, 12, 12a, 14, 16, 17, 18, 20 and 21 (emboldened) are currently specified for C7 IUP use - the remainder (annotated "#") are specified for internal network applications and are included for information only.

TABLE 3.5
**C7 IUP timer requirements**

| TIMER | PURPOSE | SETTING MIN | MAX | VALUE | STARTED | CANCELLED | NETWORK WHERE RUN |
|---|---|---|---|---|---|---|---|
| **TO-01** | For called sub held. Notes 13 & 2 | 2s | 3m | 2m | When the Called Sub clears first. | When the Calling Sub. clears or Called Sub. re-answers | Outgoing |
| **TO-02** | For non-receipt of answer | 1m | 12m | Note 12 | On receipt of ACM | On receipt of Answer or Clear/Release. Note 1 | Outgoing |
| **TO-03** | To allow Re-answer Note 2 | 2s | 5m | Note 12 | When Called Sub. clears first. | Receipt of Release forward or when called Sub re-answers | Incoming |
| **TO-04** | To delay release of Circuit to exchange in overload. Note 3. | 2m | 2m | 2m | When overload received from next node. | Never cancelled. Always matures to initiate release. | Outgoing |
| **TO-05** | Awaiting Answer | 1m | 14m | Note 12 | When set-up in term node is complete & detected. | On receipt of Answer. Note 1. | Incoming (terminating node) |
| **TO-06** | To determine; -end of dialling -number length at intermediate node. | 1s | 6s | 4s | On receipt of a digit. Note 14. | On receipt of a subsequent digit | Any |
| #TO-07 | Emergency Call Set Up: To initiate re-attempt to select a free outgoing circuit on encountering congestion. | | | | | | |
| **TO-08** | For non-receipt of; -Blocking/ Unblocking acknowledgement | 1s | 40s | 30s | On sending; - Blocking - Unblocking | On receipt of Blocking/ Unblocking acknowledgement. | Both |
| **TO-08a** | For non-receipt of Unblocking acknowledgement | 5m | 15m | 10m | Started on sending an Unblocking message due to expiry of Timer TO-08 for the third time, or restarted on expiry of Timer TO-08a. | On receipt of Unblocking Acknowledgement. | Both |

| TIMER | PURPOSE | SETTING | | VALUE | STARTED | CANCELLED | NETWORK WHERE RUN |
|---|---|---|---|---|---|---|---|
| | | MIN | MAX | | | | |
| **TO-09** | Awaiting appropriate backward message after IFAM/IAM/ SAM/FAM or forward Group 7 message is sent during call setup phase. Note 8. | 5s | 30s | 30s | Note 8 | Note 8 | Outgoing. |
| **TO-10** | To await forward Release | 1s | 40s | 25s | Note 9 | On receipt of forward release. | Incoming |
| #TO-11 | For non-receipt of manual hold. | | | | | | |
| **TO-12** | Await receipt of circuit free or blocking message. Note 11 | 1s | 60s | 25s | On sending release. | On receipt of Cct. free or Blocking | Both Note 4 |
| **TO-12a** | Await receipt of circuit free or blocking message | 5m | 15m | 10m | Started on sending a third Release message due to expiry of Timer TO-12, or restarted on expiry of Timer TO-12a. | On receipt of Circuit Free or Blocking | Both |
| #TO-13 | Await receipt of Unblocking. | | | | | | |
| **TO-14** | Await receipt of Additional Info. Message. Note 5 | 1s | 40s | 5s | When request is sent. | When message is received | Both |
| #TO-15 | For non-receipt of Dialled Digit. Applies before minimum number of digits received. | | | | | | |
| **TO-16** | For prolonged call set-up. Note 10. | 1m | 3m | 3m Note 6 | When calling customer initiates call request | On receipt of Address Complete or Sub Clears/ release. | Outgoing |
| **TO-17** | Non-receipt of SAM or FAM in response to "Send All Digits" | 5s | 20s | 20s | When SAD is sent. Re-started on receipt of SAM. | On receipt of FAM | Incoming |
| **TO-18** | Non-receipt of SAM or FAM in response to "Send N Digits" | 5s | 3m | Note 7 | When SND is sent. | On receipt of SAM or FAM. | Incoming |
| #TO-19 | To hold an i/c circuit after rejecting call due to overload. | | | | | | |
| **TO-20** | Reserved for use by /1/. | | | | | | |

| TIMER | PURPOSE | SETTING | | VALUE | STARTED | CANCELLED | NETWORK WHERE RUN |
|---|---|---|---|---|---|---|---|
| | | MIN | MAX | | | | |
| TO-21 | To enable call clear due to non-receipt of resume indication | 3m | 3m | 3m | On receipt of suspend indication from customer | On receipt of resume indication from customer | Both |

NOTES FOR TABLE 3.5

1) It is recommended that, within a network, Timer TO-05 is greater than Timer TO-02. However, between networks this may not always apply.

2) Timer TO-03, at the Terminating Node, ensures cleardown if the backward Clear (sent on Called Sub Clears) is lost and Timer TO-01 at the Outgoing Network is therefore not started.

3) It is recommended that Timer TO-04 is less than Timer TO-19.

4) When provided at each end of the same circuit, Timer TO-12 ensures release of the circuit if circuit free/blocking messages are lost.

5) Timer TO-14 is a general purpose protection timeout that is to be run whenever a response message is expected.

6) This value is not critical, but 3 minutes is recommended.

7) The current value of Timer TO-18 depends on the node and the number of digits required, see table 3-6 below:

TABLE 3.6
**Values for Timer TO-18**

| NUMBERS OF DIGITS REQUEST | TERMINATING EXCHANGE VALUE | INTERMEDIATE EXCHANGE VALUE |
|---|---|---|
| 1 | 20sec | 20sec |
| 2 | 40sec | 40sec |
| 3 | 60sec | 60sec |
| 4 | 80sec | 60sec |
| 5 | 100sec | 60sec |
| 6 | 120sec | 60sec |
| 7 | 140sec | 60sec |
| 8 | 160sec | 60sec |
| 9 to 15 | 180sec | 60sec |

8) Timer TO-09 is

    i) started on sending of the IFAM or IAM;

    ii) restarted on sending of any forward Group 7 message if Timer TO-09 is currently running;

    iii) started or restarted on sending of SAM or FAM;

    iv) cancelled on receipt of a SEND N DIGITS, SEND ALL DIGITS or ADDRESS COMPLETE message.

9) Timer TO-10 is started when any of the following backward messages are sent;

    - Release
    - Congestion
    - Terminal Congestion
    - Sub. Engaged
    - Sub. Out of Order
    - Repeat Attempt
    - CNA

10) Timer TO-16 is started on sending of IAM/IFAM and cancelled by Address Complete Message, RELEASE Message or when the calling subscriber clears.

11) Timer TO-12 is additionally used, in bothway circuit configuration, to supervise clearing of the bearer circuit.

12)     Values for Timers TO-02, 03 and 05 differ in fixed and mobile applications, and shall be agreed bilaterally.

13)     Timer TO-01 is a general timeout for the Called Sub Held condition in the Outgoing Network (Originating Node); different variants of this timer come into force depending upon the Clearing Programme in operation. Table 3.7 lists the associated basic Clearing Programmes. Special Clearing Programmes - e.g. ISDN immediate releaser, Operator release - may override basic clearing programmes.

TABLE 3.7
**Values for Timer TO-01**

| Clearing Programme | Timer Designation | Setting Range | | Current Value |
|---|---|---|---|---|
| | | Min | Max | |
| First Party | TO-01a | 0 | 3m | 0 |
| Calling Party | TO-01b | 0 | 2m | 2m |
| Called Party | TO-01c | 2s | 180s | 5s |
| Last Party | TO-01d | 5s | 24h | 24h |

14)     TO-06 to be started within networks performing non-C7 Interworking where the number length is unknown, and on receipt of each digit after the minimum number of digits have been received.

15)     Timer TO-21 was formerly TO-x.


**END OF PNO-ISC/SPEC/006 § 3**

# 4 TELEPHONY CALL

## 4.0 Scope

This section of PNO-ISC/SPEC/006, in conjunction with other sections, provides information necessary to enable the operation of a telephony call between public networks via a C7 IUP interconnection.

The telephony call defined by this section is initiated by the originating network setting the IAM/IFAM message indicators SHP=0 and CTI=0 or 1(normal or diverted call respectively). Although a number of the IUP messages allow a range of parameter codes to be employed, not all these are necessarily required to support the telephony call service between UK networks. The minimum set required is subject to bi-lateral agreement.

This section currently excludes calls with:

- Protection (IAM/IFAM Protection Indicator = 1)

- Priority Access (IAM/IFAM Priority Access Indicator = 1)

- Last Party Release (ACM LPR indicator = 1).

## 4.1 Service Overview

The IUP telephony call service provides the facilities for establishing and releasing a bearer connection, suitable for telephony communication, between calling and called customers. The service does not require any third party assistance (e.g. operator) nor does it include any supplementary service requested by the calling customer.

## 4.2  Formats and Codes

IUP messages required to support the telephony call service are specified in Table 4.1.

Table 4.1 lists the IUP messages and, where appropriate, their specific parameter field values (i.e. additional to message header, label and reserved parameters), that are required to support the telephony call service. Messages associated with network management/failure/error handling/congestion procedures are not listed; the appropriate procedures of section 3 apply.

All message label and header parameter codes shall comply with those specified in section 2 appropriate to the message type.

Parameters and parameter fields shown as reserved in section 2 are not included below.

Values of parameter fields are in decimal format.

TABLE 4.1
**IUP messages and parameter values for the telephony call service**

| IUP Message | Parameter | Parameter Field Name | Section 2 ref. | Permitted values | Receiving network action (**if other values received**) |
|---|---|---|---|---|---|
| IAM/IFAM | Message Indicator | CPC | 2.4.16 | 0-16 | Default (Note 2) |
| | | CLI | 2.4.16 | Any (Note 3) | - |
| | | CBI | 2.4.16 | Any (Note 3) | - |
| | | INT | 2.4.16 | Any (Note 3) | |
| | | IW | 2.4.16 | Any (Note 3) | - |
| | | PA | 2.4.16 | 0 | Not applicable (Note 1) |
| | | MDG | 2.4.16 | Any (Note 3) | - |
| | | PROT. IND. | 2.4.16 | 0 | Not applicable (Note 1) |
| | | SHP | 2.4.16 | 0 | Not applicable (Note 1) |
| | | RPI | 2.4.16 | Any (Note 3) | - |
| | | LPD | 2.4.16 | Any (Note 3) | - |
| | | CTI | 2.4.16 | 0 or 1 | Not applicable (Note 1) |
| | | ECD | 2.4.16 | Any (Note 3) | - |
| | | NTA | 2.4.16 | Any (Note 3) | - |
| | | ISI | 2.4.16 | Any (Note 3) | - |
| | | RCI | 2.4.16 | Any (Note 3) | - |

| IUP Message | Parameter | Parameter Field Name | Section 2 ref. | Permitted values | Receiving network action (if other values received) |
|---|---|---|---|---|---|
| | | CPI | 2.4.16 | 0, 2 | Default (Note 2) |
| | | PNI | 2.4.16 | Any (Note 3) | - |
| | Called Address | No. of Called Address Signals | 2.4.9 | Any (Note 3) | - |
| | | Address Signals | 2.4.9 | Any (Note 3) | - |
| | Line Identity | Nature of Add. | 2.4.19 | Any (Note 3) | - |
| | | IAI | 2.4.19 | Any (Note 3) | - |
| | | IQ | 2.4.19 | Any (Note 3) | - |
| | | No. of Address Signals | 2.4.19 | Any (Note 3) | - |
| | | Address Signals | 2.4.19 | Any (Note 3) | - |
| SND | No. of digits requested. | - | 2.4.26 | Any (Note 3) | - |
| SAD | - | - | 2.3.28 | - | - |
| SAM/FAM | Called Address | No. of Called Address Signals | 2.4.9 | Any (Note 3) | - |
| | | Address Signals | 2.4.9 | Any (Note 3) | - |
| ACM | Message Indicators | CdPC | 2.4.7 | 0-16 | Default (Note 2) |
| | | Charge Indicator | 2.4.7 | 1 | Default (Note 2) [default=1] |
| | | LPR | 2.4.7 | 0 | Not applicable (Note 1) |
| | | IW Ind. | 2.4.7 | Any (Note 3) | - |
| | | ECD Ind | 2.4.7 | Any (Note 3) | - |
| ANS | Type of Answer | - | 2.4.30 | Any (Note 3) | - |

| IUP Message | Parameter | Parameter Field Name | Section 2 ref. | Permitted values | Receiving network action (if other values received) |
|---|---|---|---|---|---|
| CLEAR | - | - | 2.3.9 | - | - |
| RE-ANSWER | - | - | 2.3.24 | - | - |
| RELEASE | Reason | - | 2.4.24 | Any (Note 3) | - |
| CIRCUIT FREE | - | - | 2.3.8 | - | - |
| CNA | Reason | - | 2.4.15 | Any (Note 3) | - |
| SASUI | Information Indicator | - | 2.4.25 | Any (Note 3) | - |
| ASUI (type 1) | Information Contained | - | 2.4.8 | Any (Note 3) | - |
|  | Line Identity | Nature of Add. | 2.4.19 | Any (Note 3) | - |
|  |  | IAI | 2.4.19 | Any (Note 3) | - |
|  |  | IQ | 2.4.19 | Any (Note 3) | - |
|  |  | No. of Address Signals | 2.4.19 | Any (Note 3) | - |
|  |  | Address Signals | 2.4.19 | Any (Note 3) | - |
| ASUI (type 2) | Information Contained | - | 2.4.8 | Any (Note 3) | - |
|  | PCLI | - | 2.4.23 | Any (Note 3) | - |
| ACI (type 1) | ICC/IRC | - | 2.4.2 | Any (Note 3) | - |
|  | Message Indicator | Operator Indicator | 2.4.3 | Any (Note 3) | - |
|  | Line Identity | Various | 2.4.19 | As IAM/IFAM | |
| ACI (type 2) | ICC/IRC | - | 2.4.2 | Any (Note 3) | - |
|  | PCLI | - | 2.4.23 | Any (Note 3) | - |
| ACI (type 3) | ICC/IRC | - | 2.4.2 | Any (Note 3) | - |
|  | Subscriber's Basic Service Markings | Various | 2.4.11 | Any (Note 3) | - |
|  | Message Indicator | Sub. Tariff group | 2.4.4 | Any (Note 3) | - |
|  |  | Operator Indicator | 2.4.4 | Any (Note 3) | - |

| IUP Message | Parameter | Parameter Field Name | Section 2 ref. | Permitted values | Receiving network action (if other values received) |
|---|---|---|---|---|---|
| | Line Identity | Various | 2.4.19 | As IAM/IFAM | |
| ACI (type 4) | ICC/IRC | - | 2.4.2 | Any (Note 3) | - |
| | Called Subscriber's Basic Service Markings | Various | 2.4.11 | Any (Note 3) | - |
| | Message Indicator | Called Sub. Tariff group | 2.4.5 | Any (Note 3) | - |
| ACI (type 5) | ICC/IRC | - | 2.4.2 | Any (Note 3) | - |
| | Calling Subscriber's Originating Facility Service Markings | Various | 2.4.12 | Any (Note 3) | - |
| ACI (type 6) | ICC/IRC | - | 2.4.2 | Any (Note 3) | - |
| | Called Subscriber's Terminating Facility Service Markings | Various | 2.4.10 | Any (Note 3) | - |
| ACI (type 7) | ICC/IRC | - | 2.4.2 | Any (Note 3) | - |

NOTE 1 - Only the value(s) specified is relevant to the telephony call service. Any other value is outside the scope of this section.

NOTE 2 - Field can be set to any appropriate value from the quoted permitted range as determined by the sending network and subject to normal interworking agreements and procedures. If any value outside the quoted range is received a default value of 0 (unless otherwise indicated) shall be assumed and the call shall continue.

NOTE 3 - "Any" means the field can be set to any appropriate value (excluding values marked "reserved") specified in section 2 for the message type as determined by the sending network and subject to normal interworking agreements and procedures.

## 4.3  Signalling Procedures

Unless otherwise stated in this section, the procedures required to support the telephony call service are common to all permitted parameter field values shown in Table 4.1. Other sections of PNO-ISC/SPEC/006 may specify additional procedures.

The IUP telephony call service described in this section uses the following protocols and procedures of section 3:

   a)  Bearer establishment protocol,

   b)  Telephony protocol,

   c)  Clear (re-answer) procedure (see also 4.3.4 of this Section),

   d)  Bearer release protocol,

   e)  SASUI and ACI protocols (where the telephony call encounters supplementary services operational within the incoming network the outgoing network may receive requests for additional information from the incoming network via SASUI or ACI (request) messages).

### 4.3.1  Initial action of the outgoing network

The outgoing network shall initiate the establishment of a bearer call in accordance with section 3.

### 4.3.2  Subsequent action of both networks (up to and including called customer answer)

Both networks follow the procedures of the bearer establishment and telephony protocols as described in section 3. Both networks shall take account of the setting of the IAM/IFAM Call Path Indicator when selecting a transmission path for the call.

Where the IAM/IFAM CPC is set to 13, to indicate an Operator Services Operator, the incoming network shall, if information related to the called customer is available, send an ACI (Type 4) message (section 3 refers).

Where the ACI protocol is invoked, the ACI (response) message shall preferably contain the information requested. Table 4.2 gives permitted alternatives in order of preference. If a non-permitted response is received the message shall be treated in accordance with the unexpected message procedure of section 3.

In the case of the terminating network receiving CONFUSION as a result of sending ACI (request) it shall either:

i)      allow the call to continue, or

ii)     if the information requested is essential, fail the call by sending to the originating network a CNA or RELEASE message in accordance with sub-section 3.2.3.1 with reason [02] "Network Termination".

TABLE 4.2
**ACI (response) message - permitted alternative Information Requested Codes and Information Contained Codes**

| Information Request Code (IRC) received (in ACI request) | Permitted Alternative Information Contained Code(s) (ICC) (in order of preference) |
|---|---|
| 00000001 [1] | 00000011 [3] |

| Information Request Code (IRC) received (in ACI request) | Permitted Alternative Information Contained Code(s) (ICC) (in order of preference) |
|---|---|
| 00000010 [2] | 00000100 [4] |
| 00000101 [5] | 00000001 [1] |
| | 00000011 [3] |
| 00000110 [6] | 00000010 [2] |
| | 00000100 [4] |
| | 00000111 [7] |
| 00000111 [7] | No alternative permitted |
| 00001000 [8] | No alternative permitted |
| 00001001 [9] | No alternative permitted |
| 00001011 [11] | No alternative permitted |
| 00001100 [12] | 00000001 [1] |
| | 00000011 [3] |

NOTE - Refer to Section 2 for the ICC/IRC meanings.

### 4.3.3  Transmission Path Connection

To enable:

   a) the calling customer to be notified of the status of the call at relevant stages of its establishment and

   b) bothway communication between customers at call answer,

the transmission paths between incoming and outgoing networks shall be connected as follows:

The backward transmission path (i.e. incoming network---> outgoing network) shall be connected by the outgoing network prior to or on receipt of the ACM from the incoming network. Backward transmission path connection within the incoming network is outside the scope of this specification.

The forward transmission path (i.e. outgoing network---> incoming network) shall be connected by the incoming network prior to or on the sending of the ANS message to the outgoing network. Forward transmission path connection within the outgoing network is outside the scope of this specification.

### 4.3.4  Clear (Re-Answer)

The Clear (Re-Answer) protocol (outlined in section 3) and detailed below allows the called customer to temporarily suspend an established call and, subject to a timer dependent period, re-establish it.

**4.3.4.1** If the terminating network determines that the called customer has cleared, it shall:

   a) send a CLEAR message to the outgoing network,

   b) start Timer TO-03 (refer to section 3).

**4.3.4.2** On receipt of a CLEAR message from the incoming network, the originating network shall start Timer TO-01 (refer to section 3).

**4.3.4.3** If, prior to TO-03 maturity, the terminating network determines that the called customer has re-established the call, it shall:

  a) send a RE-ANSWER message to the outgoing network,

  b) stop Timer TO-03.


**4.3.4.4** If, prior to TO-01 maturity, the originating network receives a RE-ANSWER message from the incoming network, the originating network shall:

  a) stop Timer TO-01,

  b) allow the call to proceed.


**4.3.4.5** If timer TO-03 matures the terminating network shall initiate cleardown in accordance with section 3 by sending a RELEASE message with REASON value [48] "Subscriber Call Termination" to the outgoing network.

**4.3.4.6** If Timer TO-01 matures the originating network shall initiate cleardown down in accordance with section 3 by sending a RELEASE message with REASON value [48] "Subscriber Call Termination" to the incoming network.

### 4.3.5  Call Release

The procedures of section 3 shall apply.

## 4.4 Message Sequence Diagram

**Originating Network**          **Interconnect Route**          **Terminating Network**

**C7 IUP**

**Bearer establishment protocol section 3**

IFAM (or IAM + all routeing digits)

[for comments refer to Table 4.1]

**Telephony Protocol section 3**

**Clear (re-answer) protocol – refer to 4.3.4**

**Bearer Release protocol section 3**
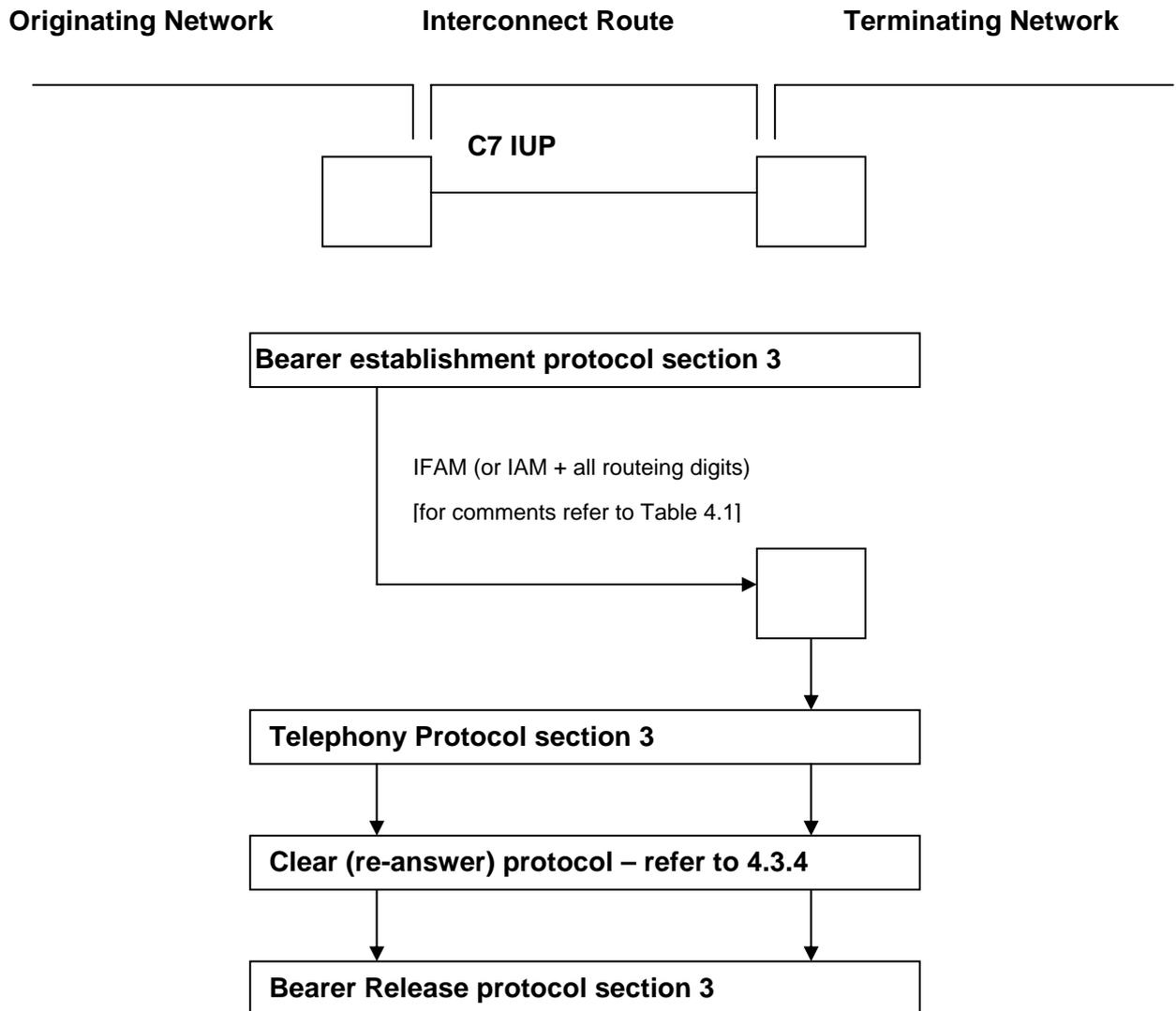
FIGURE 4.1

**Telephony Call**

**END OF PNO-ISC/SPEC/006 § 4**

# 5  SPARE

**END OF PNO-ISC/SPEC/006 § 5**

# 6  ISDN CALL

## 6.0  Scope

This section, in conjunction with other sections, provides information necessary to enable the operation of an ISDN Call between Public Networks via a C7 IUP interconnection. However the ISDN Call defined by this section does not fully support the ISDN services defined by ETSI.

The ISDN call defined by this section is initiated by the originating network setting the IAM/IFAM message indicators SHP=1 and CTI=0 or 1 (normal or diverted call respectively). Although a number of the IUP messages allow a range of parameter values to be employed, a minimum set is required to support the basic level of service described in 6.1 and that formation of extended sets is subject to bi-lateral agreement.

This section currently excludes calls with:

- Protection (IAM/IFAM Protection Indicator = 1)

- Priority Access (IAM/IFAM Priority Access Indicator = 1)

- Last Party Release (ACM LPR indicator = 1)

## 6.1  Service Overview

The IUP ISDN Call provides the facilities for establishing and releasing an ISDN bearer connection, including data communication at 64kbit/s (ITU-T rec. G.70x refers), between Calling and Called Customers. The exchange of terminal identity and compatibility information is also provided, together with the ability to change the use of the ISDN bearer. The service does not require any third party assistance (e.g. operator) but does include the necessary signalling support for supplementary services (i.e. CUG, NAE and terminal portability)(note: support of these services is an operator option)

## 6.2 Formats and Codes

IUP messages required to support the ISDN service are specified in Table 4.1 of section 4 as modified by Table 6.1 of this section. The formats and codes of all IUP messages shall comply with section 2.

Table 6.1, in conjunction with Table 4.1 of section 4, lists the IUP messages and, where appropriate, their specific parameter field values (i.e. additional to message header, label and reserved parameters), that are required to support the ISDN Call Service. Where Table 6.1 differs from Table 4.1 of section 4, Table 1 of this section takes precedence. Messages associated with network management/ failure/ error handling/ congestion procedures are not listed- the appropriate procedures of section 3 apply.

Parameters and Parameter fields shown as reserved in section 2 are not included.

Values of parameter fields shown in this section are in decimal format.

TABLE 6.1
**IUP messages and parameter values for the ISDN call service**

| IUP Message | Parameter | Parameter Field Name | PNO-ISC/ SPEC/006 Section 2 ref. | Permitted values | Receiving Network action (if other values received) |
|---|---|---|---|---|---|
| IAM/IFAM | Message Indicators | CPC | 2.4.16 | Any (Note 2) | |
| | | IW | 2.4.16 | 0 | Not applicable (Note 1) |
| | | SHP | 2.4.16 | 1 | Not applicable (Note 1) |
| | | CPI | 2.4.16 | Any (Note 2) | |
| SIM (type 2) | ICC/IRC | - | 2.4.18 | Any (Note 2) | |
| | Facility Indicator Code | - | 2.4.17 | Any (Note 2) | |
| | Service Indicator Code | - | 2.4.27 | Any (Note 2) | |
| | Line Identity | All | 2.4.19 | As IAM/IFAM (see section 4) | |
| SIM (type 3) | ICC/IRC | - | 2.4.18 | Any (Note 2) | |
| | Facility Indicator Code | - | 2.4.17 | Any (Note 2) | |
| | Service Indicator Code | - | 2.4.27 | Any (Note 2) | |

| IUP Message | Parameter | Parameter Field Name | PNO-ISC/ SPEC/006 Section 2 ref. | Permitted values | Receiving Network action (if other values received) |
|---|---|---|---|---|---|
| | Closed User Group Interlock Code | - | 2.4.13 | Any (Note 2) | |
| | Line Identity | All | 2.4.19 | As IAM/IFAM (see section 4) | |
| SIM (type 5) | ICC/IRC | - | 2.4.18 | Any (Note 2) | |
| | Facility Indicator Code | - | 2.4.17 | Any (Note 2) | |
| | Service Indicator Code | - | 2.4.27 | Any (Note 2) | |
| | Line Identity | All | 2.4.19 | As IAM/IFAM (see section 4) | |
| | Six Character Network Address Extension | - | 2.4.29 | Any (Note 2) | |
| SIM (type 6) | ICC/IRC | - | 2.4.18 | Any (Note 2) | |
| | Facility Indicator Code | - | 2.4.17 | Any (Note 2) | |
| | Service Indicator Code | - | 2.4.27 | Any (Note 2) | |
| | Closed User Group Interlock Code | - | 2.4.13 | Any (Note 2) | |
| | Line Identity | All | 2.4.19 | As IAM/IFAM (see section 4) | |
| | Six Character Network Address Extension | - | 2.4.29 | Any (Note 2) | |
| SIM (type 7) | ICC/IRC | - | 2.4.18 | Any (Note 2) | - |
| | Facility Indicator Code | - | 2.4.17 | Any (Note 2) | |
| SIM (type 8) | ICC/IRC | - | 2.4.18 | Any (Note 2) | |

SEE PAGE 2 FOR THE NORMATIVE INFORMATION

| IUP Message | Parameter | Parameter Field Name | PNO-ISC/ SPEC/006 Section 2 ref. | Permitted values | Receiving Network action (if other values received) |
|---|---|---|---|---|---|
| | Facility Indicator Code | - | 2.4.17 | Any (Note 2) | |
| | Line Identity | All | 2.4.19 | As IAM/IFAM (see section 4) | |
| ACM | Message Indicators | IW Ind. | 2.4.7 | 1, 3-15, 17, 19-31 | Not applicable (Note 1) |
| CLEAR (Note 3) | - | - | 2.3.9 | - | - |
| RE-ANSWER (Note 3) | - | - | 2.3.2.4 | - | - |
| SUSPEND | - | - | 2.3.39 | - | - |
| RESUME | - | - | 2.3.40 | - | - |
| SWAP | Service Indicator Code | - | 2.4.27 | Any (Note 2) | |

NOTE 1 - Only the value(s) specified is relevant to the ISDN Call service. Any other value is outside the scope of this section.

NOTE 2 - "Any" means the field can be set to any appropriate value (excluding values marked "reserved") specified in section 2 for the message type as determined by the sending network and subject to normal interworking agreements and procedures.

NOTE 3 - Message is not applicable when IAM/IFAM has CPI=1.

## 6.3. Signalling Procedures

Unless otherwise stated in this section, the procedures required to support the ISDN call service are common to all permitted parameter field values shown in Table 6.1. Other sections of PNO-ISC/SPEC/006 may specify additional procedures.

The IUP ISDN Call service described in this section uses the following Protocols and procedures of section 3:

   a) Bearer Establishment Protocol,

   b) ISDN Protocol,

   c) User-initiated SUSPEND and RESUME protocol (refer to 6.3.5),

   d) SWAP procedure (refer to 6.3.6),

   e) Bearer Release Protocol.

   f) Where the ISDN call encounters Supplementary services operational within the terminating network the originating network may receive requests for additional information from the terminating network via SASUI or ACI (request) messages. The SASUI and ACI Protocols are also described in section 3.

NOTE - If the ISDN protocol is not supported then, depending on the IAM/IFAM CPI value, the call may either be failed or continue as a telephony call in accordance with section 4. Refer to section 3 for details.

### 6.3.1  Initial action of the outgoing network

The Outgoing Network shall initiate the establishment of a Bearer Call in accordance with section 3.

### 6.3.2  Subsequent action of both networks (up to and including called customer answer)

Both Networks follow the procedures of the Bearer Establishment and ISDN Protocols as described in section 3. The following list gives the permitted SIM Types for the ISDN Call service:

SIM-A - Type 7 only.

SIM-B - Types 2, 3, 5 or 6 (which particular SIM-B type is sent depends on the information requested in the SIM-A and the information available to the sending network- refer to Table 6.2).

SIM-C - Type 8 only.

TABLE 6.2
**Permitted SIM-B message types**

| Type 7 SIM-A  IRC | Is calling subscriber a member of CUG? | Has calling subscriber supplied a NAE? | Permitted SIM-B | |
|---|---|---|---|---|
| | | | Type | ICC |
| 3 | No | - | 2 | 3 |
| 3 | Yes | - | 3 | 2 |
| 5 | No | No | 2 | 3 |
| 5 | No | Yes | 5 | 5 |
| 5 | Yes | No | 3 | 2 |
| 5 | Yes | Yes | 6 | 4 |

Refer to section 4 for application of the ACI protocol.

### 6.3.3 Transmission Path Connection

The procedures of section 4 shall apply.

### 6.3.4 User-initiated SUSPEND and RESUME

NOTE - Support of this protocol is an operator option.

The User-initiated SUSPEND and RESUME protocol (outlined in section 4) and detailed below allows both the calling and / or called customer to temporarily suspend an established call and, subject to a timer dependent period, re-establish it.

### 6.3.4.1

If either the terminating or originating network determines that its customer wishes to suspend the call, it shall:

> a) send a SUSPEND message,

> b) start Timer TO-21

### 6.3.4.2

The network that receives the SUSPEND message shall process it appropriately such that the call enters the suspended state.

### 6.3.4.3

If, prior to TO-21 maturity, the network in which it is running determines that its customer wishes to resume the call, it shall:

> a) send a RESUME message,

> b) stop Timer TO-21.

### 6.3.4.4

The network that receives the RESUME message shall process it appropriately such that the suspended state is cancelled.

### 6.3.4.5

If timer TO-21 matures the network in which it is running shall initiate clear down in accordance with section 4 by sending a RELEASE message with REASON value [02] "Network Termination".

### 6.3.5 SWAP procedure

NOTE - Support of this procedure is an operator option.

The SWAP procedure enables the use of the ISDN bearer to be changed, subsequent to call establishment and prior to release.

### 6.3.5.1

If either originating or terminating network determines that a valid change of mode is being requested by its customer it shall send a SWAP message containing the appropriate new Service Indicator Code.

### 6.3.5.2

The network that receives the SWAP message shall determine the validity of the SWAP request.

### 6.3.5.2.1

If the SWAP request is valid a SWAP message containing the same SIC as that received shall be sent.

### 6.3.5.2.2

If the SWAP request is not valid a SWAP message containing the SIC relevant to the current use of the bearer shall be sent.

### 6.3.5.3

The call should now proceed with either the new mode of use of the bearer or the original use until either call release or another SWAP message exchange.

## 6.3.6  Treatment of CONFUSION message

As the ISDN call service requires the running of protocols and procedures that utilise group 7 messages (i.e. ISDN call, SWAP, User-initiated SUSPEND and RESUME and, possibly, ACI) the general requirements of sub-section 3.3.4 (CONFUSION message procedures) apply.

### 6.3.6.1  ISDN Call protocol

In the case of the terminating network receiving CONFUSION during the running of the ISDN call protocol, the call shall be failed by the sending to the originating network a CNA or RELEASE message in accordance with sub-section 3.2.3.1 with reason [02] "Network Termination".

In the case of the originating network receiving CONFUSION during the running of the ISDN call protocol, the call shall be failed by the sending to the terminating network a RELEASE message in accordance with sub-section 3.2.4.1 or 3.2.4.2 as appropriate with reason [02] "Network Termination".

NOTE - In the case of call failure as described above it is recommended that a report is made to management.

### 6.3.6.2  User initiated SUSPEND and RESUME protocol

In the case that a CONFUSION message is received in response to the sending of SUSPEND message (and timer TO-21 is still running- refer to 6.3.4) the CONFUSION message shall be discarded and the call shall continue in the suspend state.

In the case that a CONFUSION message is received in response to the sending of RESUME message the CONFUSION message shall be discarded and the call shall continue in the pre-suspend state.

### 6.3.6.3  SWAP procedure

In the case that a CONFUSION message is received in response to the sending of SWAP message the CONFUSION message shall be discarded and the call shall continue with its bearer in the existing mode.

### 6.3.6.4  ACI protocol

In the case of the terminating network receiving CONFUSION as a result of sending ACI (request) it shall either:

a)  if the information requested is essential, fail the call by sending to the originating network a CNA or RELEASE message in accordance with sub-section 3.2.3.1 with reason [02] "Network Termination", or

b)  allow the call to continue.

### 6.3.7  Call Release

The procedures of section 3 shall apply.

## 6.4  Message Sequence Diagram

**Originating Network**　　　　　**Interconnect Route**　　　　　**Terminating Network**

**C7 IUP**

**Bearer establishment protocol section 3**

IFAM (or IAM + all routeing digits)

[for comments refer to sub-section 6.2]

**ISDN call protocol section 3**

**Suspend/ Resume and/or SWAP  (6.3.4, 6.3.5)**

**Bearer Release protocol section 3**
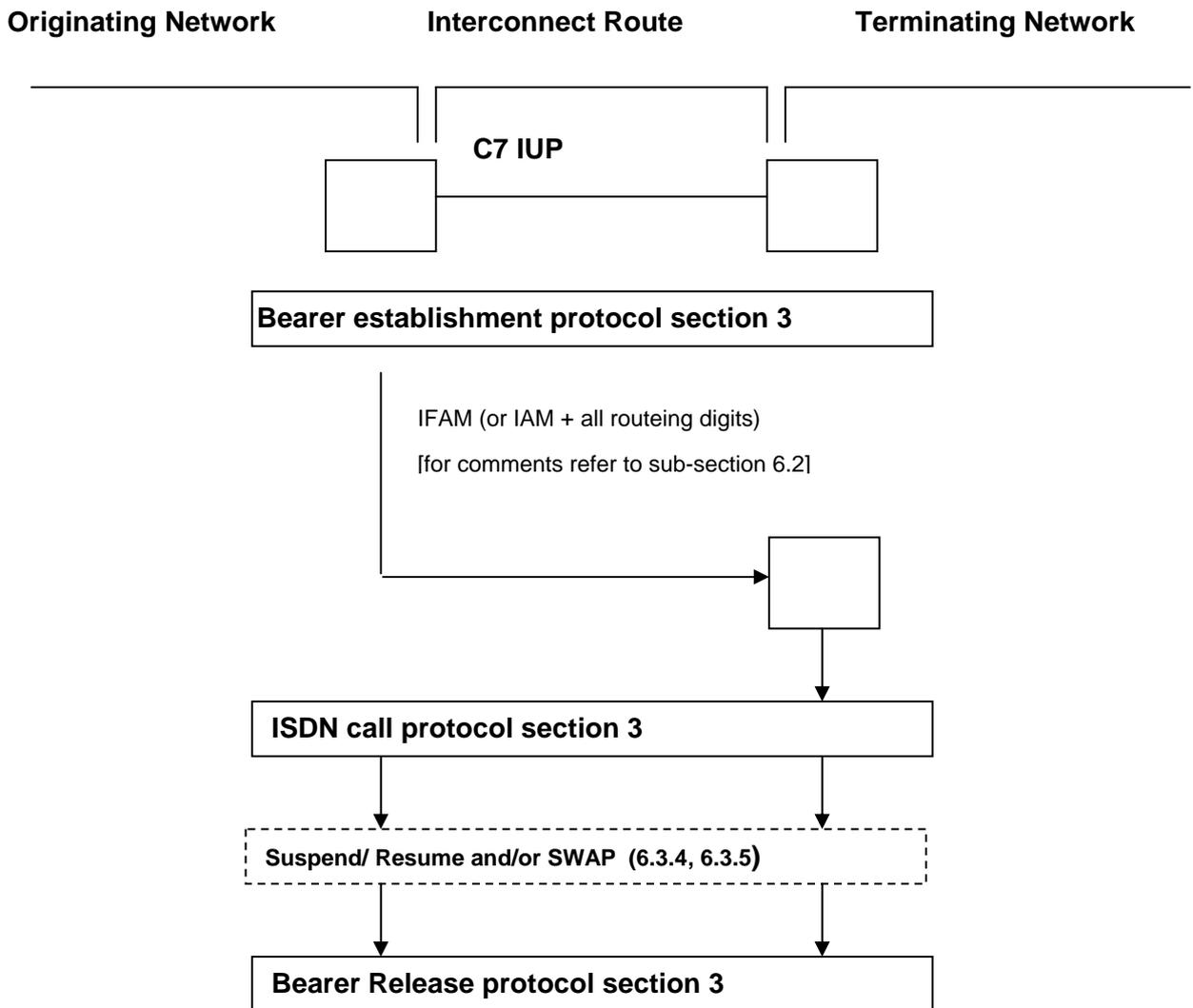
FIGURE 6.1

**ISDN Call**

**END OF PNO-ISC/SPEC/006 § 6**

# 7  SPARE

**END OF PNO-ISC/SPEC/006 § 7**

# 8  SPARE

**END OF PNO-ISC/SPEC/006 § 8**

# 9 CALLING LINE IDENTIFICATION PRESENTATION & RESTRICTION (CLIP & CLIR)

## 9.0 Scope

This section specifies the signalling formats, codes and procedures of the Signalling System No. 7 UK Interconnect User Part (IUP), for telephony and ISDN calls on interconnections between telecommunications networks in the UK, to support the UK Calling Line Identification (CLIP) and Calling Line Identification Restriction (CLIR) supplementary services. These services incorporate the Calling Number Display supplementary service formerly specified for the telephony basic service.

## 9.1 Service Overview

The full service description is given in /4/.

## 9.2 Information Flows

The flows are specified in terms of a "preferred method" in which the NN is sent in an IAM/IFAM at the time of initial call setup, and an "alternative method" in which the NN may be requested by the terminating network following receipt of an IAM/IFAM. The flows specified allow interworking between these two methods.

> NOTE - The CLIP/CLIR service utilises the basic call, ACI and/or SIM protocols as specified in Section 3.

### 9.2.1 Preferred method

#### 9.2.1.1 Telephony call

When the PNI shows that a presentation number is available, the called customer has CLIP active and the terminating network supports the PN option, the PN is requested by the terminating network. When the PN is indicated as being available but the terminating network does not support the PN option, the NN shall be used for the CLIP Service.

When the PNI shows that a PN is not available and the called customer has CLIP active, the NN shall be used for the CLIP service.

> NOTE - If the terminating access is ISDN and the two-number delivery service is supported and active, then both the NN and PN might be displayed.

#### 9.2.1.2 ISDN call

The terminating network always requests a CLI for support of the CLIP service. If the two number delivery option is not supported and active, the CLI received by the terminating network in response to this request shall be used for the CLIP Service. If the two number delivery option is supported and active, the NN received in the I(F)AM might be used in addition.

### 9.2.2 Alternative method

The alternative method may be used where the NN cannot be sent or recognised at initial call setup.

#### 9.2.2.1 Telephony call

When the called customer has CLIP active, the PN and/or NN (or neither) shall be requested according to their availability as indicated by the originating network and the capabilities of the terminating network. The PN and/or NN shall then be sent by the originating network together with the associated Identity Qualifier.

> NOTE - If the terminating access is ISDN and the two-number delivery service is supported and active, then both the NN and PN might be displayed.

### 9.2.2.2 ISDN call

The terminating network always requests a CLI for support of the CLIP service. If the two number delivery option is not supported and active, the CLI received by the terminating network in response to this request shall be used for the CLIP Service. If the two number delivery option is supported and active, the NN may also be explicitly requested.

## 9.3 Formats and Codes

### 9.3.1 Messages

#### 9.3.1.1 ACI

The format of ACI messages Type 1 and Type 7 shall conform to Section 2.

#### 9.3.1.2 Confusion

The format of the Confusion message shall conform to Section 2.

#### 9.3.1.3 IAM/IFAM

The format of the IAM/IFAM shall conform to Section 2.

#### 9.3.1.4 SIM

The format of the SIM-A and SIM-B shall conform to Section 2.

### 9.3.2 Codings

#### 9.3.2.1 Calling Line Identity

The format and coding shall conform to Section 2, Line Identity. In the Line Identity Message Indicators parameter field:

Bits BA, NAI: shall be set to   '10' = national (significant) number

or      '11' = international number

or      '00', when a SIM B with an empty LI parameter is sent (see Table 9.6 Note 5);

Bit C, IAI: shall be set to '0' = 'complete address'.

#### 9.3.2.2 Display Qualifier Information

The Display Qualifier Information shall comprise the CLI Blocking Indicator (CBI): Bit B of the IAM/IFAM Message Indicators parameter field, and the Identity Qualifier (IQ): Bit D of the LI Message Indicators parameter field. The format shall conform to Section 2. The coding shall be as shown in Table 9.1.

TABLE 9.1
**Display Qualifier Information**

| | Network Number (NN) | Presentation Number (PN) | CLI Blocking Indicator (CBI) | Network Number Identity Qualifier (NNIQ) | Presentation Number Identity Qualifier (PNIQ) |
|---|---|---|---|---|---|
| CLIR operational but **not** invoked, PN **not** available | Available | Not applicable | 1 | 0 | N/A |
| | Unavailable Note 1 | Not applicable | 0 | 0 | N/A |
| CLIR operational but **not** invoked, PN available | Available Note 2 | Available | 1 | 0 | 0 |
| | Unavailable Notes 2 and 3 | Available | 0 Note 3 | 0 Note 3 | 0 |
| CLIR operational and invoked, PN available Note 4 | Withheld | Withheld | 1 | 1 | 1 |
| CLIR operational and invoked, PN **not** available | Withheld | Not applicable | 1 | 1 | N/A |
| CLIR **not** operational, PN **not** available | Unavailable | Not applicable | 0 | 0 | N/A |

NOTE 1 - This shall only be used in exceptional circumstances. See Rule CLI-4 in /16/.

NOTE 2 - The choice between available and unavailable for NN is a customer subscription option.

NOTE 3 - In the interim some networks may use 'withheld' instead of 'unavailable' and, as a result, set both the CBI and NNIQ to '1'.

NOTE 4 - This case also covers the NN available and NN unavailable customer options.

### 9.3.2.3 Presentation Number Indicator

The coding of the Presentation Number Indicator (PNI) shall conform to Section 2.

NOTE – In the interim some existing implementations do not set the PNI according to this specification and, as a result, in the case of a telephony call, the PN, although available, might not be requested by the terminating network. In such circumstances, the PN will not be delivered until the originating network conforms to this specification.

### 9.3.2.4 Screening Indicator

The Screening Indicator (SI) shall be indicated by the presence and position of the Hex B character (binary 1011, decimal 11) in, or its absence from, the address signals subfield within the Line Identity parameter as follows:

Hex B in initial (most significant) digit position = user provided not verified (UPNV)

Hex B in any position other than initial or final (least significant) position = user provided verified and passed (UPVP)

Hex B absent from digit string = network provided (NP).

NOTE - On calls originating from DASS2 accesses, Hex B in the final digit position may be used to indicate an incomplete number.

Additionally, in the case of a UPVP number, the Hex B shall be positioned such that it is preceded by the digits that comprise the network provided portion of the number, and followed by the digits that comprise the user provided portion of the number.

NOTE - If interworking with ISUP has occurred the Hex B might be positioned between the sixth and seventh least significant digits. If the call is incoming from the international network and the International value of NAI is not

supported by the Interworking Point then the Hex B might be positioned immediately preceding the country code.

## 9.4   Signalling Procedures

The bearer establishment protocol as specified in Section 3, in conjunction with the telephony call procedures as specified in Section 4 or the ISDN call procedures as specified in Section 6 as appropriate, shall apply.

### 9.4.1 Initial actions at originating network

The CLI Blocking Indicator (CBI) shall be set in accordance with Table 9.1. The PNI shall be set in accordance with Table 9.2. The Line Identity parameter of the I(F)AM (if sent) shall contain a Network Number in accordance with Table 9.2.

Table 9.2

| Information available to IUP[3] | | | Information transported in IUP IAM/IFAM | | | | |
|---|---|---|---|---|---|---|---|
| | | | PNI | Line Identity[6] | | | |
| UP-NN | UP-PN | NP-PN | | Digits | NAI[4] | SI | IQ |
| None | UPVP | yes / no[2] | 1 | NP-NN[5] | National or International | no HexB | See NNIQ in Table 9.1 |
| None | UPNV | yes / no[2] | 1 | NP-NN[5] | National or International | no HexB | |
| None | None | yes | 1 | NP-NN[5] | National or International | no HexB | |
| None | None | no | 0 | NP-NN[5] | National or International | no HexB | |
| UPVP[1] | UPVP[1] | yes / no[2] | 1 | UPVP-NN | as provided | mid HexB | |
| UPVP | None | yes | 1 | UPVP-NN | as provided | mid HexB | |
| UPVP | None | no | 0 | UPVP-NN | as provided | mid HexB | |

NOTE 1: This case presupposes an enhanced screening function.

NOTE 2: 'yes / no' indicates that the presence or absence of a NP-PN is not relevant to the coding.

NOTE 3: An OLE may choose not to make all CLI information available to IUP, but a network provided network number is always assumed to be available.

NOTE 4: If the Line Identity is International, then the NAI might not be set to international, in the case where the implementation does not support the International value of the NAI field. As described in section 2, in this case, the NAI is set to "National" and the digits of the CLI are prefixed with a leading zero.

NOTE 5: In the exceptional case that a network provided network number is not available, the Line Identity parameter shall be omitted.

NOTE 6: The preferred method is to include the NN (NP or UPVP) in the I(F)AM. Alternatively, the I(F)AM may be sent without any Line Identity parameter.

### 9.4.1.1          Preferred method

The originating network shall send an IAM/IFAM with the full NN in the CLI field. The Identity Qualifier associated with the NN (NNIQ) shall be set in accordance with Table 9.1.

### 9.4.1.2          Alternative method

The originating network shall send an IAM/IFAM without any CLI.

### 9.4.2 Actions at terminating network on receipt of IAM/IFAM

### 9.4.2.1          Telephony Call

The actions at a terminating network on receipt of an IAM/IFAM shall be as shown in Table 9.3.

TABLE 9.3
**Actions at terminating network on receipt of IAM/IFAM for telephony call**

| CLIP Active ? | CBI | NN recd & recog? | PNI Note 3 | Is terminating network able to send IRC=12? Note 1 | NN IQ | Action | Variances (see reference) |
|---|---|---|---|---|---|---|---|
| N | - | - | - | - | - | None | - |
| Y | 0 | - | 0 | - | - | CLI unavailable | 9.5.1.2/9.5.1.3 |
| Y | 0 | - | 1 | Y Note 2 | - | Send ACI 7: IRC=12 | 9.5.1.2/9.5.1.3 |
| Y | 1 | Y | 1 | Y | - | Send ACI 7: IRC=12 | 9.5.1.4/9.5.1.5 |
| Y | 1 | Y | 0 | - | 1 | CLI withheld | 9.5.1.7 |
| Y | 1 | Y | 0 | - | 0 | Display NN | 9.5.1.7 |
| Y | 1 | N | 1 | Y | - | Send ACI 7: IRC=12 | 9.5.1.6 |
| Y | 1 | N | 0 | - | - | Send ACI 7: IRC=1 | 9.5.1.7 |

NOTE 1 - Some terminating networks do not support PN and therefore cannot send ACI7: IRC=12.

NOTE 2 - In the interim some terminating networks do not request PN if CBI=0.

NOTE 3 - Some existing implementations do not recognise the presentation number indicator, and either never request a PN, or request a PN even if the PNI = 0. The actions to be taken in these cases is described in Table 9.9, and the variance column above shows the appropriate references within that table.

### 9.4.2.2    ISDN call

On receipt of an IAM/IFAM for an ISDN call, the terminating network will send a SIM-A to the originating network in accordance with Section 6. The value of the IRC depends on the other services and/or facilities required.

> NOTE - Some terminating networks might send ACI Type 7: IRC=1 (irrespective of whether the I(F)AM contained a CLI) before sending the SIM-A. This NN may be required for two number delivery or other purposes.

### 9.4.3 Actions at originating network on receipt of ACI Type 7 or SIM-A

### 9.4.3.1 Actions at originating network on receipt of ACI Type 7 with IRC=12

The actions at an originating network on receipt of an ACI Type 7 with IRC=12 shall be as shown in Table 9.4

Table 9.4
**Actions at originating network on receipt of ACI Type 7 with IRC=12[7]**

| Information available to IUP[3] | | | Message sent | Contents of ACI Type 1 Line Identity field | | | |
|---|---|---|---|---|---|---|---|
| UP-NN | UP-PN | NP-PN | | Digits | NAI[4] | SI | IQ |
| None | UPVP | yes / no[2] | ACI 1: ICC=12 | UPVP-PN | as provided | mid HexB | See PNIQ in Table 9.1 |
| None | UPNV | yes / no[2] | ACI 1: ICC=12 | UPNV-PN | as provided | leading HexB | See PNIQ in Table 9.1 |
| None | None | yes | ACI 1: ICC=12 | NP-PN | National or International | no HexB | See PNIQ in Table 9.1 |
| None | None | no | ACI 1: ICC=1[5,6] | NP-NN | National or International | no HexB | See NNIQ in Table 9.1 |
| UPVP[1] | UPVP[1] | yes / no[2] | ACI 1: ICC=12 | UPVP-PN | as provided | mid HexB | See PNIQ in Table 9.1 |
| UPVP | None | yes | ACI 1: ICC=12 | NP-PN | National or International | no HexB | See PNIQ in Table 9.1 |
| UPVP | None | no | ACI 1: ICC=1[6] | UPVP-NN | as provided | mid HexB | See NNIQ in Table 9.1 |

NOTE 1: This case presupposes an enhanced screening function.

NOTE 2: 'yes / no' indicates that the presence or absence of a NP-PN is not relevant to the coding.

NOTE 3: An OLE may choose not to make all CLI information available to IUP, but a network provided network number is always assumed to be available.

NOTE 4: If the Line Identity is International, then the NAI may not be set to international, in the case where the implementation does not support the International value of the NAI field. As described in section 2, in this case, the NAI is set to "National" and the digits of the CLI are prefixed with a leading zero.

NOTE 5: In the exceptional case that a network provided network number is not available, the procedures of section 9.5.2 apply.

NOTE 6: Exceptionally, a Confusion message may be sent, if an IAM/IFAM with the full NN in the Line Identity field has already been sent to the terminating network.

NOTE 7: In the exceptional case that the ACI Type 7 with IRC=12 cannot be understood by the originating network, a Confusion message shall be sent in response.

### 9.4.3.2 Actions at originating network on receipt of ACI Type 7 with IRC=1

On receipt of an ACI Type 7 with IRC=1, the originating network shall send an ACI Type 1 with ICC=1 to the Terminating Network. The contents of the Line Identity field shall be as shown in Table 9.5.

Table 9.5

| Information available to IUP[3] | | | Contents of ACI Type 1 Line Identity field | | | |
|---|---|---|---|---|---|---|
| UP-NN | UP-PN | NP-PN | Digits | NAI[4] | SI | IQ |
| None | UPVP | yes / no[2] | NP-NN[5] | National or International | no HexB | See NNIQ in Table 9.1 |
| None | UPNV | yes / no[2] | NP-NN[5] | National or International | no HexB | |
| None | None | yes / no[2] | NP-NN[5] | National or International | no HexB | |
| UPVP[1] | UPVP[1] | yes / no[2] | UPVP-NN | as provided | mid HexB | |
| UPVP | None | yes / no[2] | UPVP-NN | as provided | mid HexB | |

NOTE 1: This case presupposes an enhanced screening function.

NOTE 2: 'yes / no' indicates that the presence or absence of a NP-PN is not relevant to the coding.

NOTE 3: An OLE may choose not to make all CLI information available to IUP, but a network provided network number is always assumed to be available.

NOTE 4: If the Line Identity is International, then the NAI may not be set to international, in the case where the implementation does not support the International value of the NAI field. As described in section 2, in this case, the NAI is set to "National" and the digits of the CLI are prefixed with a leading zero.

NOTE 5: In the exceptional case that a network provided network number is not available, the procedures of section 9.5.2 shall apply.

### 9.4.3.3 Actions at originating network on receipt of SIM-A

On receipt of a SIM-A, the originating network shall send a SIM-B to the Terminating Network in accordance with Section 6. The values of the IRC and ICC depend on the other services and/or facilities applicable. The contents of the Line Identity field in the SIM-B shall be as shown in Table 9.6.

Table 9.6
**Actions at originating network on receipt of SIM-A**

| Information available to IUP[3] | | | Contents of SIM-B Line Identity field | | | |
|---|---|---|---|---|---|---|
| UP-NN | UP-PN | NP-PN | Digits | NAI[4] | SI | IQ |
| None | UPVP | yes / no[2] | UPVP-PN | as provided | mid HexB | See PNIQ in Table 9.1 |
| None | UPNV | yes / no[2] | UPNV-PN | as provided | leading HexB | See PNIQ in Table 9.1 |
| None | None | yes | NP-PN | National or International | no HexB | See PNIQ in Table 9.1 |
| None | None | no | NP-NN[5] | National or International[5] | no HexB[5] | See NNIQ in Table 9.1[5] |
| UPVP[1] | UPVP[1] | yes / no[2] | UPVP-PN | as provided | mid HexB | See PNIQ in Table 9.1 |
| UPVP | None | yes | NP-PN | National or International | no HexB | See PNIQ in Table 9.1 |
| UPVP | None | no | UPVP-NN | as provided | mid HexB | See NNIQ in Table 9.1 |

NOTE 1: This case presupposes an enhanced screening function.

NOTE 2: 'yes / no' indicates that the presence or absence of a NP-PN is not relevant to the coding.

NOTE 3: An OLE may choose not to make all CLI information available to IUP, but a network provided network number is always assumed to be available.

NOTE 4: If the Line Identity is International, then the NAI may not be set to international, in the case where the implementation does not support the International value of the NAI field. As described in section 2, in this case, the NAI is set to "National" and the digits of the CLI are prefixed with a leading zero.

NOTE 5: In the event that the NP-NN is unsuitable for display in support of the CLIP service, or the exceptional case that a NP-NN is not available, the Line Identity parameter shall be empty (i.e. the "Message Indicators" and "Number of Address Signals" fields shall be set to all zeros, and the "Line Identity Address Digits" field shall not be included in the message).

### 9.4.4 Actions at terminating network on receipt of ACI Type 1

The actions at a terminating network on receipt of an ACI Type 1 message shall be as shown in Table 9.7.

TABLE 9.7
**Actions at terminating network on receipt of ACI Type 1**

| ICC | CBI | IQ | Available PN already received? Note 1 | SINGLE NUMBER DELIVERY Action | TWO NUMBER DELIVERY | |
|-----|-----|-----|-----|-----|-----|-----|
| | | | | | 1st Action | 2nd Action Note 2 |
| 1 | 1 | 1 | N | CLI Withheld | CLI Withheld | None |
| 1 | 1 | 1 | Y | Display PN | Display PN | CLI Unavailable |
| 1 | 1 | 0 | N | Display NN | Display NN | None |
| 1 | 1 | 0 | Y | Display PN | Display PN | Display NN |
| 1 | 0 | - | N | CLI Unavailable | CLI Unavailable | None |
| 1 | 0 | - | Y | Display PN | Display PN | CLI Unavailable |
| 12 | N/A | 1 | N/A | CLI Withheld | CLI Withheld | None |
| 12 | 1 | 0 | N/A | Display PN | Display PN | Display NN Note 3 |
| 12 | 0 | 0 | N/A | Display PN | Display PN | None |

NOTE 1 - This is true only if a previously received ACI Type 1 with ICC=12 or SIM-B had an IQ set to "0".

NOTE 2 - Some implementations only display the NN if the screening indicator of the PN is UPNV.

NOTE 3 - If not already received the NN shall be requested by sending an ACI Type 7 with IRC=1 to the originating network.

### 9.4.5 Actions at terminating network on receipt of SIM-B

The actions at a terminating network on receipt of a SIM-B message shall be as shown in Table 9.8.

TABLE 9.8
Actions at terminating network on receipt of SIM -B

| IQ | SINGLE NUMBER DELIVERY | TWO-NUMBER DELIVERY | |
|----|------------------------|---------------------|---|
| | **Action / number displayed** | **Action / first number displayed** | **Action / second number displayed** |
| 1 | CLI Withheld | CLI Withheld | None |
| 0 | Display SIM-B | Display SIM-B | Display NN Notes 1,2 |

NOTE 1 – The NN shall only be displayed if the CBI = 1.

NOTE 2: - An ACI 7 with IRC=1 shall be sent to the originating network to obtain the NP-NN unless already received, in which case that number is used. Some implementations only display the NN if the screening indicator of the PN is UPNV, in which case it is not necessary to request the NN.

## 9.5   Variances

This subsection specifies the actions that shall be taken by networks that do not conform to the requirements of 9.4.

### 9.5.1 Actions at terminating network that does not support the Presentation Number Indicator, on receipt of IAM/IFAM

At a terminating network that does not support PNI, the actions on receipt of an IAM/IFAM shall be as shown in Table 9.9.

TABLE 9.9
**Actions at terminating network that does not support PNI, on receipt of IAM/IFAM**

| Ref. | CLIP Active? | CBI | NN received and recognised | Is terminating network able to send IRC=12? | NN IQ | Action |
|------|--------------|-----|----------------------------|---------------------------------------------|-------|--------|
| 9.5.1.1 | N | - | - | - | - | None |
| 9.5.1.2 | Y | 0 | - | N | - | CLI unavailable |
| 9.5.1.3 | Y | 0 | - | Y Note 2 | - | Send ACI 7: IRC=12 |
| 9.5.1.4 | Y | 1 | Y | N | 1 | CLI Withheld |
| 9.5.1.5 | Y | 1 | Y | N | 0 | Display NN |
| 9.5.1.6 | Y | 1 | N | N | - | Send ACI 7: IRC=1 |
| 9.5.1.7 | Y | 1 | - | Y | - | Send ACI 7: IRC=12 Note 1 |

NOTE 1 - If two number delivery is active the NN may also be requested.

NOTE 2 - In the interim some terminating networks do not request PN if CBI=0.

### 9.5.2 Actions at originating network at which CLI is not available, on receipt of ACI Type 7

The action at an originating network at which CLI is not available, on receipt of ACI Type 7 shall be to send an ACI Type 2 message with ICC=3 (PCLI), or exceptionally, a CONFUSION message.

### 9.5.3 Actions at terminating network on receipt of CONFUSION or ACI Type 2 with ICC=3 in response to ACI Type 7, or on expiry of TO-14

At a terminating network the actions on receipt of a Confusion message or an ACI Type 2 message with ICC=3, in response an ACI Type 7 message, or on expiry of TO-14 shall be as shown in Table 9.10.

TABLE 9.10
**Actions at terminating network on receipt of Confusion or ACI Type 2
with ICC=3, in response ACI Type 7, or on expiry of TO-14**

| CBI | NN received and recognised | Event | NNIQ | Action |
|---|---|---|---|---|
| 1 | Y | Any | 0 | Display NN |
| 0 | Y | Any | - | CLI unavailable |
| 1 | Y | Any | 1 | CLI withheld |
| 1 | N | CFN in response to IRC=12 | - | Send ACI 7: IRC=1 |
| 1 | N | Expiry of TO-14 after IRC=12 | - | Send ACI 7: IRC=1 Note |
| 0 | N | CFN in response to IRC=12 | - | CLI unavailable |
| 0 | N | Expiry of TO-14 after IRC=12 | - | CLI unavailable |
| - | N | CFN in response to IRC=1 | - | CLI unavailable |
| - | N | Expiry of TO-14 after IRC=1 | - | CLI unavailable |
| - | N | ACI 2: ICC=3 | - | CLI unavailable |

NOTE - Optionally the CLI shall be marked as unavailable.

**END OF PNO-ISC/SPEC/006§9**

# 10  NUMBER PORTABILITY

## 10.0  Scope

The purpose of this section is to define the Interconnect User Part (IUP) protocol requirements for the interconnection between UK operators for both the Geographic and Non-Geographic Number Portability services in compliance with the respective service descriptions.

The Geographic Number Portability service description is contained in /14/.

The Non-Geographic Number Portability service description is contained in /15/.

The Mobile Number Portability service description is contained in /17/

## 10.1  Formats and Codes

### 10.1.1  Messages

The format and contents of all messages shall conform to Section 2.

### 10.1.2  Parameters

The format of all parameters shall conform to Section 2.

#### 10.1.2.1  Called Address Parameter

#### 10.1.2.1.1 Called Address Parameter for Geographic Number Portability

The Called Address Parameter in the IAM/IFAM shall include a six digit field called the Number Portability Prefix (NPP). The first address digit of the NPP shall be the value 5 to indicate a ported number. For Geographic Number Portability, the last five digits of the NPP comprise the Recipient Exchange Code (REC). The first address digit of the REC can be any value except 0 which has been reserved for other uses including Non-Geographic Number Portability.

NOTE - The list of NPPs will be maintained by OFCOM.

The contents of the Address Signals sub-field of the Called Address Parameter for Geographic Number Portability are shown in Figure 10.1.
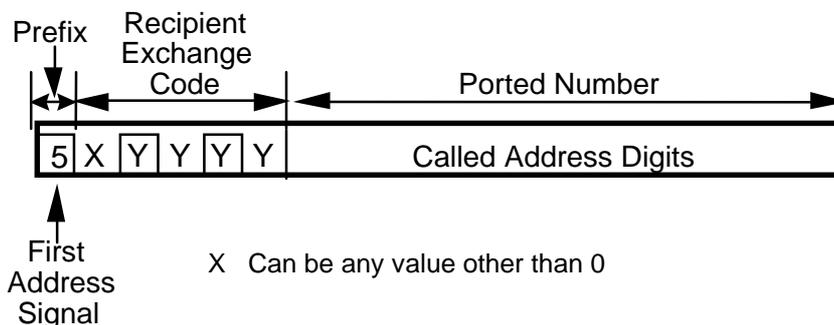


NOTE: The called address digits include the National Access Code, 'Leading Zero'

FIGURE 10.1
**Address Signals Sub-field for Geographic Number Portability**

**10.1.2.1.2 Called Address Parameter for Non-Geographic Number Portability**

The Called Address Parameter in the IAM/IFAM shall include a six digit field called the Number Portability Prefix (NPP). The first address digit of the NPP shall be the value 5 to indicate a ported number. For Non-Geographic Number Portability (NGNP) the first three address digits in the Number Portability Prefix field are defined as the NGNP prefix identifier. For the allocation of the "Z" and "Y" digit values refer to the National Telephone Numbering Plan available from Ofcom., The last three digits (YYY) of the NPP comprise the Recipient Network Code and may be of any value.

NOTE - The list of NPPs will be maintained by OFCOM.

The contents of the Address Signals sub-field of the Called Address Parameter for Non Geographic Number Portability are shown in Figure 10.2.
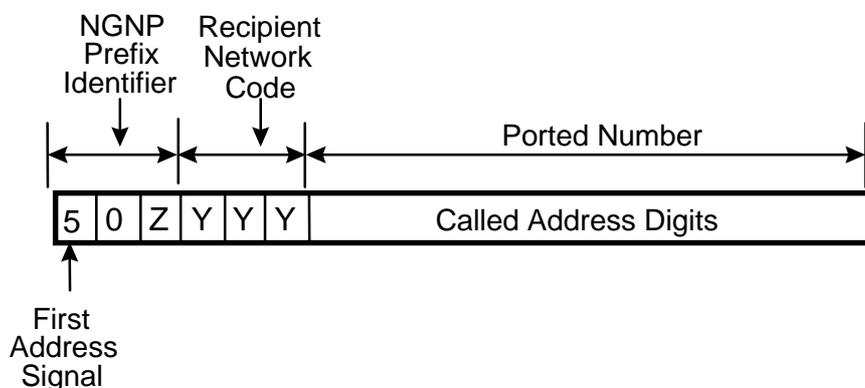


NOTE: The called address digits include the National Access Code, 'Leading Zero'

FIGURE 10.2
**Address Signals Sub-field for Non Geographic Number Portability**

**10.1.2.1.3  Called Address Parameter for Mobile Number Portability**

The Called Address Parameter in the IAM/IFAM shall include the five digit Mobile Rerouteing Code (07xyz) as a prefix to the ported number.

NOTE: The xyz digits denote the recipient Mobile Operator.

The contents of the Address Signals sub-field of the Called Address Parameter for Mobile Number Portability are shown in Figure 10.3.

```
       Mobile
      Rerouteing
        Code
        (MRC)              NNG
   ┌──────────────┐   ┌──────────┐
   │              │   │          │
   ┌───┬───┬───┬───┬───┬───┬───────────────────────┐
   │ 0 │ 7 │ x │ y │ z │ a │ b │ c │ Subscriber Number │
   └───┴───┴───┴───┴───┴───┴───────────────────────┘
```
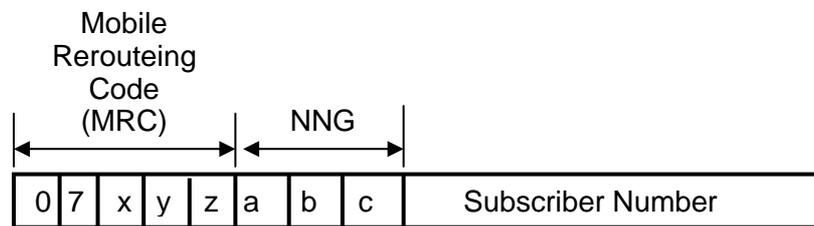
Note: The NNG does not include the leading 's' digit.

FIGURE 10.3
**Address Signals Sub-field for Mobile Number Portability**

## 10.2  Signalling Procedures

The bearer establishment protocol as specified in Section 3 shall apply.

### 10.2.1  Actions at the Donor Network

The donor network shall send an IAM/IFAM to the recipient or third party network. The Called Address parameter shall be constructed in accordance with 10.1.2.1 of this section. The NPP / MRC is used by the donor network to route the call to the POI of the recipient network or third party network.

### 10.2.2  Actions at the Third Party Network

The third party network uses the NPP / MRC in the Called Address parameter of the IAM/IFAM to route the call to the POI of the recipient network.

### 10.2.3  Actions at the Recipient Network

The recipient network uses the NPP / MRC and the other called address digits in the Called Address parameter of the IAM/IFAM to route the call.

## 10.3  Message Sequence Diagram

The following message sequence diagram is applicable to the Geographic, Non-Geographic and Mobile Number Portability services.



FIGURE 10.4

**Number Portability**

**END OF PNO-ISC/SPEC/006 § 10**

# 11 COMPLETION OF CALLS TO BUSY SUBSCRIBER (CCBS)

## 11.0 Scope

This section specifies the IUP signalling to support the UK CCBS supplementary service. This service also uses SCCP /7/ and TCAP /8/ signalling for the notification elements. This implementation is known as IUP CCBS and complies with /3/.

The service description and terms relating to this service appear in /3/. A brief outline description of the service is given below in order to give context to the IUP CCBS specification that appears in the remainder of this document.

The IUP formats and codes that are used for the initial and CCBS call elements and described in this section are contained in Section 2.

NOTE - The IUP CCBS service requires the terminating network to generate the IUP CNA message (which is used to indicate the availability of the CCBS service) irrespective of the setting of the Release Protocol Indicator in the IAM/IFAM.

## 11.1 Service Overview

### 11.1.1 Activation

When User A encounters a busy User B, the originating network retains the call information for a period of time. During this time User A can activate the CCBS service.

Having activated CCBS, User A can originate and receive calls as normal.

### 11.1.2 Invocation and Operation

When User B becomes free the terminating network starts a guard timer, allowing User B the opportunity to make an outgoing call.

If the guard timer expires and User B is still free, the terminating network informs the originating network that User B is free.

If User A is free the originating network alerts User A that User B is free by means of a CCBS recall. When User A accepts the CCBS recall then the originating network establishes a CCBS call to the terminating network.

## 11.2 Formats and Codes

The formats and codes of IUP messages shall conform to Section 2.

### 11.2.1 Initial Address Message/Initial and Final Address Message (IAM/IFAM)

The IAM/IFAM for the CCBS call shall contain the following service specific information.

#### 11.2.1.1 IAM/IFAM Message Indicators

Call Type Indicator (CTI) = 7 (CCSS Call) indicates that the outgoing network is establishing a CCBS call.

### 11.2.2 Connection Not Admitted (CNA) Message

The CNA message sent during the initial call attempt, when User B is busy, shall contain the following information depending on the state of the CCBS service at the network destination serving User B:

Diagnostics Field = 00000001  CCBS possible using SCCP/TCAP

      = 00000010  CCBS not possible

SEE PAGE 2 FOR THE NORMATIVE INFORMATION

## 11.3  Signalling Procedures

The CCBS Supplementary Service procedures described in this section are written as exceptions to Section 4 and Section 6 as appropriate.

### 11.3.1  General

CCBS uses two IUP call procedures, which are:

- the initial call made from User A to a busy User B and,

- the CCBS call from the originating network when the terminating network has informed the originating network that User B is free.

### 11.3.2  Initial Call

#### 11.3.2.1  Actions at Originating Network

The initial call shall be set up in accordance with Section 4 or 6 as appropriate.

If the originating network receives either a CNA message with reason (7) – 'Congestion, no re-routeing possible' or a CNA message with reason (8) – 'Subscriber Busy' message, with the diagnostics parameter set to 00000001 – 'CCBS possible using SCCP/TCAP', then the CCBS Supplementary Service is initiated if User A activates the service.

If the originating network receives either a CNA message with reason (7) – 'Congestion, no re-routeing possible' or a CNA message with reason (8) – 'Subscriber Busy message', with the diagnostics parameter set to anything other than 0000001 – 'CCBS possible using SCCP/TCAP', then the CCBS Supplementary Service will not be initiated even if User A attempts to activate the service.

#### 11.3.2.2  Actions at the Terminating Network

If during the initial call attempt User B is busy, the terminating network shall inform the originating network that CCBS is possible by sending either a CNA message with a CNA message with reason (7) – 'congestion, no re-routeing allowed' or a CNA message with reason (8) – 'Subscriber busy', with the Diagnostics parameter = 00000001 – 'CCBS possible using SCCP/TCAP'

If during the initial call attempt User B is busy but unable to accept CCBS call reservation for reasons described in /3/, the terminating network shall inform the originating network that CCBS is not possible by sending either a CNA message with reason (7) – 'congestion, no re-routeing allowed' or a CNA message with reason (8) - 'Subscriber busy', with the Diagnostics parameter = 00000010 – 'CCBS not possible'.

NOTE - The CNA reason value sent is determined by the terminating network taking into account the type of service provided to User B.

### 11.3.3  CCBS Call

If the terminating network informs the originating network that User B is free, and the CCBS service can be activated, the originating network alerts User A. If User A accepts the CCBS re-call, then the originating network shall establish a CCBS call to the terminating network.

The CCBS call shall be set up in accordance with Section 4 or 6, as appropriate, except that the CTI in the message indicators parameter in the IAM/IFAM shall be coded = 7 - 'CCSS Call'.

## 11.4  Message Sequence Diagrams

The diagrams below show the message sequences for an initial call to a busy User B and the subsequent CCBS call.

### 11.4.1  Initial Call to Busy User

```
┌──────────────┐              C7 IUP              ┌──────────────┐
│ Originating  ├─────────────────────────────────┤ Terminating  │
│ Network      │                                 │ Network      │
└──────────────┘                                 └──────────────┘

┌─────────────────────────────────────────────────────────────┐
│ Section 4 or 6, as appropriate – Bearer Establishment Protocol│
└─────────────────────────────────────────────────────────────┘

              I(F)AM                              ┌────┐
         ────────────────────────────────────────▶│    │
                                                  └────┘
┌────┐     CNA = Reason 7 or 8 + Diagnostics = CCBS possible
│    │◀──────────────────────────────────────────
└────┘

┌─────────────────────────────────────────────────────────────┐
│ Section 4 or 6, as appropriate – Bearer Release Protocol      │
└─────────────────────────────────────────────────────────────┘
```
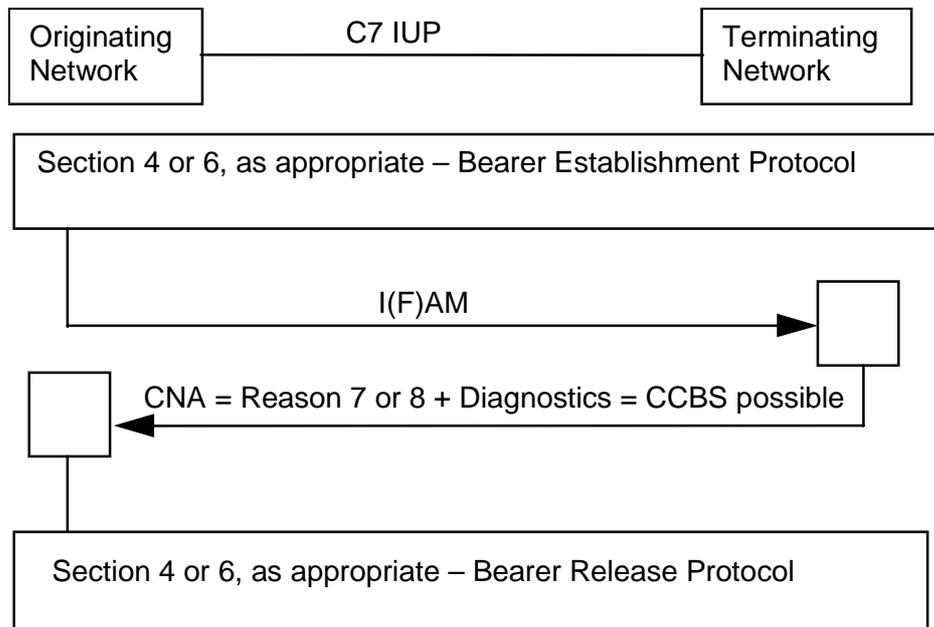
FIGURE 11.1

**Initial Call**

### 11.4.2  CCBS Call

```
┌──────────────┐              C7 IUP              ┌──────────────┐
│ Originating  ├─────────────────────────────────┤ Terminating  │
│ Network      │                                 │ Network      │
└──────────────┘                                 └──────────────┘

┌─────────────────────────────────────────────────────────────┐
│ Section 4 or 6, as appropriate - Bearer Establishment Protocol│
└─────────────────────────────────────────────────────────────┘

              I(F)AM , CTI = 7                    ┌────┐
         ────────────────────────────────────────▶│    │
                                                  └────┘
```
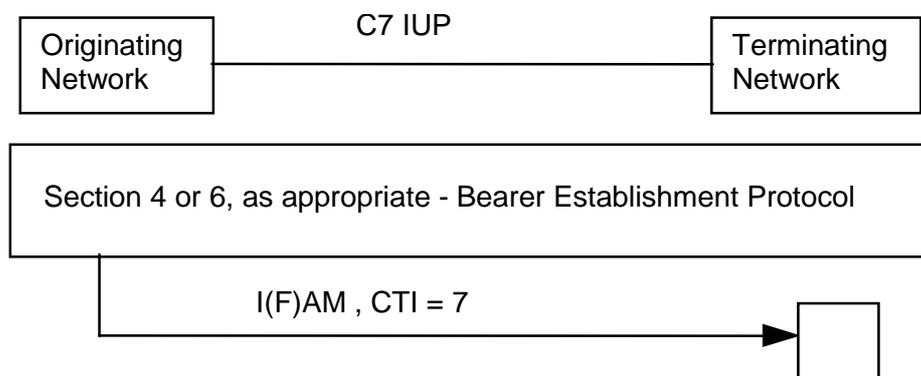
FIGURE 11.2

**Subsequent CCBS Call**

**END OF PNO-ISC/SPEC/006 § 11**

# 12 TARGETED TRANSIT

## 12.0 Scope

The purpose of this section is to define the Interconnect User Part (IUP) protocol requirements for the Signalling System No. 7 interconnection between UK operators to provide the Targeted Transit service in compliance with the service description. The service description for the Targeted Transit service is contained in /5/.

## 12.1 Formats and Codes

### 12.1.1 Messages

The format and contents of all messages shall conform to Section 2.

### 12.1.2 Parameters

### 12.1.2.1 Format and contents

The format and contents of all parameters shall conform to Section 2.

### 12.1.2.2 IAM/IFAM Called Address Parameter

The Address Signals Sub-field of the IAM/IFAM Called Address Parameter ingress and egress to the transit network shall include a four digit prefix to the called address digits, as shown in fig. 12.1. The first digit of the prefix shall be value 7. The called address digits include the national / international access code, leading zero/s.
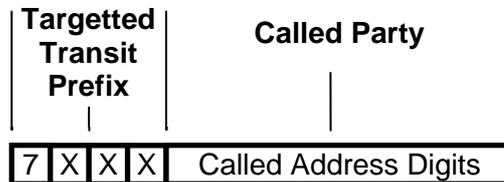
| Targetted Transit Prefix | | | | Called Party |
|---|---|---|---|---|
| 7 | X | X | X | Called Address Digits |

FIGURE 12.1
**Address Signals Sub-field**

NOTE - The four digit prefix will be assigned by OFCOM.

## 12.2  Signalling Procedures

### 12.2.1  Actions at the Originating Network

The originating network shall send an IAM/IFAM to the targeted network or transit network. The address signals sub-field in the called address parameter shall be constructed in accordance with 12.1.2.2. Subsequent action shall be in accordance with the requirements for an outgoing network as defined and specified in Section 4 or Section 6 as appropriate.

### 12.2.2  Actions at the Transit Network

The transit network shall route the call to the POI of the targeted network. The four digit prefix received in the IAM/IFAM from the originating network shall be passed unchanged in the IAM/IFAM sent to the targeted network. Subsequent action shall be in accordance with the requirements for a transit network as defined and specified in Section 3.

### 12.2.3  Actions at the Targeted Network

The targeted network shall route the call towards the required terminating network. The targeted network shall remove the four digit prefix received from the transit network before sending an IAM/IFAM to the terminating network. Subsequent action shall be in accordance with the requirements for an incoming network as defined and specified in Section 4 or Section 6 as appropriate.

### 12.2.4  Message Sequence Diagram
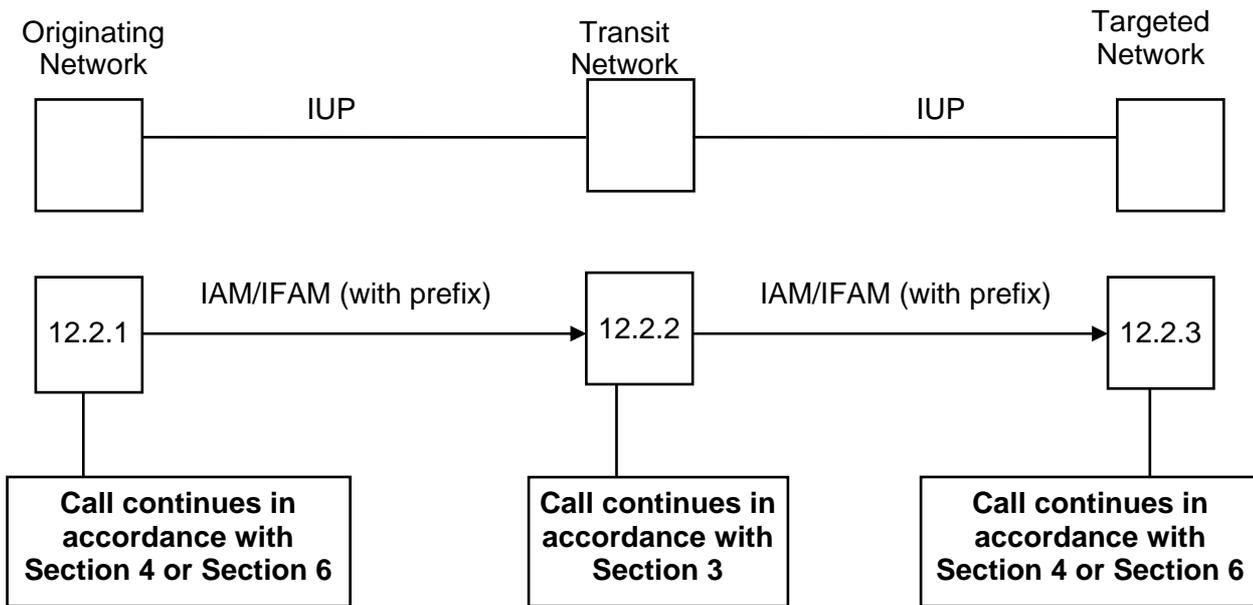


FIGURE 12.2

**Targeted Transit Message Sequence Diagram**

**END OF ISC/SPEC/006 § 12**

# 13  SPARE

**END OF PNO-ISC/SPEC/006 § 13**

## 14  SPARE

**END OF PNO-ISC/SPEC/006 § 14**

## 15  SPARE

**END OF PNO-ISC/SPEC/006 § 15**

# 16 OPERATOR SERVICES

## 16.0 Scope

This section, in conjunction with other sections, provides information necessary to enable the operation of certain operator services between Public Networks via a C7 IUP interconnection.

The operator services defined by this section are initiated by the originating network setting the IAM/IFAM message indicators SHP=0 or 1 (basic operator service) or SHP=2 (enhanced service) and CTI=0 or 1 (normal or diverted call respectively). Although a number of the IUP messages allow a range of parameter values to be employed, a minimum set is required to support the service described in 16.1 and that formation of extended sets is subject to bi-lateral agreement.

## 16.1 Service Overview

The service description for the Operator Services is contained in /18/

## 16.2 Message Types and Contents

### 16.2.1 Basic service

With the exception of the IAM/IFAM CPC, which may be set to any appropriate value, the procedures of section 4 or section 6 apply as appropriate to the calling customer/operator

### 16.2.2 Enhanced services

Tables 16.1 and 16.2 list the IUP messages and, where appropriate, their specific parameter field values (i.e. additional to message header, label and reserved parameters), that are required to support the enhanced operator services. Messages associated with network management/failure/error handling/congestion procedures are not listed - the appropriate procedures of section 3 apply.

The formats and codes of all IUP messages shall comply with section 2.

Parameters and parameter fields shown as reserved in section 2 are not included.

Values of parameter fields shown in this section are in decimal format.

TABLE 16.1
**IUP messages and parameter values for Override service**

| IUP Message | Parameter | Parameter Field Name | PNO-ISC/ SPEC/006 Section 2 ref. | Permitted values | Receiving Network action (if other values received) |
|---|---|---|---|---|---|
| IAM/IFAM | Message Indicators | CPC | 2.4.16 | 13 | Not applicable (Note 1) |
| " | " | CLI | 2.4.16 | Any (Note 3) | - |
| " | " | CBI | 2.4.16 | Any (Note 3) | - |
| " | " | INT | 2.4.16 | 0 | Default (Note 2) |
| " | " | IW | 2.4.16 | 0 | Not applicable (Note 1) |
| " | " | PA | 2.4.16 | Any (Note 3) | - |
| IAM/IFAM | Message Indicators | MDG | 2.4.16 | Any (Note 3) | - |
| " | " | PROT | 2.4.16 | Any (Note 3) | - |
| " | " | SHP | 2.4.16 | 2 | Not applicable (Note 1) |
| " | " | RPI | 2.4.16 | Any (Note 3) | - |
| " | " | LPD | 2.4.16 | Any (Note 3) | - |
| " | " | CTI | 2.4.16 | 0 | Not applicable (Note 1) |
| " | " | ECD | 2.4.16 | Any (Note 3) | - |
| " | " | NTA | 2.4.16 | Any (Note 3) | - |
| " | " | ISI | 2.4.16 | Any (Note 3) | - |
| " | " | RCI | 2.4.16 | Any (Note 3) | - |
| " | " | CPI | 2.4.16 | 0, 2 | Default (Note 2) |
| " | " | PNI | 2.4.16 | Any (Note 3) | - |
| " | Called Address | No. of Called Address Signals | 2.4.9 | Any (Note 3) | - |
| " | " | Address Signals | 2.4.9 | Any (Note 3) | - |
| IAM/IFAM | Line Identity | Nature of Add. | 2.4.19 | 2 | Default (Note 2) [default=2] |
| " | " | IAI | 2.4.19 | Any (Note 3) | - |
| " | " | IQ | 2.4.19 | Any (Note 3) | - |
| " | " | No. of Address Signals | 2.4.19 | Any (Note 3) | - |

| IUP Message | Parameter | Parameter Field Name | PNO-ISC/ SPEC/006 Section 2 ref. | Permitted values | Receiving Network action (if other values received) |
|---|---|---|---|---|---|
| " | " | Address Signals | 2.4.19 | Any (Note 3) | - |
| SND | No. of digits requested. | - | 2.4.26 | Any (Note 3) | - |
| SAD | - | - | 2.3.28 | - | - |
| SAM/FAM | Called Address | No. of Called Address Signals | 2.4.9 | Any (Note 3) | - |
| " | " | Address Signals | 2.4.9 | Any (Note 3) | - |
| SEND SERVICE | - | - | 2.3.30 | - | - |
| SERVICE | Service Code | - | 2.4.28 | 1 | Not applicable (Note 1) |
| ACI (type 4) | ICC/IRC | - | 2.4.2 | Any (Note 3) | - |
| " | Called Subscribers Basic Service Marks | Various | 2.4.11 | Any (Note 3) | - |
| " | Message Indicators | Called Sub. Tariff group | 2.4.5 | Any (Note 3) | - |
| ACM | Message Indicators | CdPC | 2.4.7 | 0-16 | Default (Note 2) |
| " | " | Charge Indicator | 2.4.7 | 1 | Default (Note 2) [default=1] |
| " | " | LPR | 2.4.7 | 0 | Not applicable (Note 1) |
| " | " | IW Ind. | 2.4.7 | Any (Note 3) | - |
| " | " | ECD | 2.4.7 | Any (Note 3) | - |
| OOR (Note 4) | - | - | 2.3.22 | - | - |
| ANS | Type of Answer | - | 2.4.30 | Any (Note 3) | - |
| HOWLER (Note 4) | - | - | 2.3.16 | - | - |

NOTE 1 - Only the value(s) specified is relevant to the Override service. Any other value is outside the scope of this section.

NOTE 2 - Field can be set to any appropriate value from the quoted permitted range as determined by the sending network and subject to normal interworking agreements and procedures. If any value outside the quoted range is received a default value of 0 (unless otherwise indicated) shall be assumed and the call shall continue.

NOTE 3 - "Any" means the field can be set to any appropriate value (excluding values marked "reserved") specified in section 2 for the message type as determined by the sending network and subject to normal interworking agreements and procedures.

NOTE 4 - The IUP messages exchanged subsequent to sending/receipt of ACM depend on the status of the terminating network customers network connection - OOR is sent to enable the calling operator to continue the call. HOWLER is sent when the called customer's termination is giving a busy indication and a howler signal is requested to be connected to the customer's line.

TABLE 16.2
**IUP messages and parameter values for Interception service**

| IUP Message | Parameter | Parameter Field Name | PNO-ISC/ SPEC/006 Section 2 ref. | Permitted values | Receiving Network action (if other values received) |
|---|---|---|---|---|---|
| IAM/IFAM | Message Indicators | CPC | 2.4.16 | Any (Note 3) | - |
| | | CLI | 2.4.16 | Any (Note 3) | - |
| | | CBI | 2.4.16 | Any (Note 3) | - |
| | | INT | 2.4.16 | Any (Note 3) | - |
| | | IW | 2.4.16 | 0 | Not applicable (Note 1) |
| | | PA | 2.4.16 | Any (Note 3) | - |
| | | MDG | 2.4.16 | Any (Note 3) | - |
| | | PROT | 2.4.16 | Any (Note 3) | - |
| | | SHP | 2.4.16 | 2 | Not applicable (Note 1) |
| | | RPI | 2.4.16 | Any (Note 3) | - |
| | | LPD | 2.4.16 | Any (Note 3) | - |
| | | CTI | 2.4.16 | 0 | Not applicable (Note 1) |
| | | ECD | 2.4.16 | Any (Note 3) | - |
| | | NTA | 2.4.16 | Any (Note 3) | - |
| | | ISI | 2.4.16 | Any (Note 3) | - |
| | | RCI | 2.4.16 | Any (Note 3) | - |
| | | CPI | 2.4.16 | 0, 2 | Default (Note 2) |
| | | PNI | 2.4.16 | Any (Note 3) | - |
| | Called Address | No. of Called Address Signals | 2.4.9 | Any (Note 3) | - |
| | | Address Signals | 2.4.9 | Any (Note 3) | - |

| IUP Message | Parameter | Parameter Field Name | PNO-ISC/ SPEC/006 Section 2 ref. | Permitted values | Receiving Network action (if other values received) |
|---|---|---|---|---|---|
| | Line Identity | Nature of Add. | 2.4.19 | 2 | Default (Note 2) [default=2] |
| | | IAI | 2.4.19 | Any (Note 3) | - |
| | | IQ | 2.4.19 | Any (Note 3) | - |
| | | No. of Address Signals | 2.4.19 | Any (Note 3) | - |
| | | Address Signals | 2.4.19 | Any (Note 3) | - |
| SND (Note 4) | | | | | |
| SAD (Note 4) | | | | | |
| SAM/FAM (Note 4) | | | | | |
| SERVICE | Service Code | - | 2.4.28 | 2-4 | Not applicable (Note 1) |
| SEND SERVICE | - | - | 2.3.30 | - | - |
| ACM | Message Indicators | CdPC | 2.4.7 | 0, 13 | Not applicable (Note 1) |
| | | Charge Indicator | 2.4.7 | Any (Note 3) | - |
| | | LPR | 2.4.7 | 0 | Not applicable (Note 1) |
| | | IW | 2.4.7 | Any (Note 3) | - |
| | | ECD | 2.4.7 | Any (Note 3) | - |
| ANS | Type of Answer | - | 2.4.30 | 0 | Not applicable (Note 1) |
| EXTEND CALL | - | - | 2.3.14 | - | - |
| COIN and FEE CHECK | - | - | 2.3.10 | - | - |
| ACI | Section 3 applies | | | | |

NOTE 1 - Only the value(s) specified is relevant to the Interception service. Any other value is outside the scope of thissection.

NOTE 2 - Field can be set to any appropriate value from the quoted permitted range as determined by the sending network and subject to normal interworking agreements and procedures. If any value outside the quoted range is received a default value of 0 (unless otherwise indicated) shall be assumed and the call shall continue.

NOTE 3 - "Any" means the field can be set to any appropriate value (excluding values marked "reserved") specified in section 2 for the message type as determined by the sending network and subject to normal interworking agreements and procedures.

NOTE 4 - Message not used on this service.

## 16.3  Signalling Procedures - Basic Service

### 16.3.1  Basic service - general

Basic operator service calls follow the procedures of section 4 or section 6 (as appropriate to the type of calling customer) except where manual hold applies, when the clear/re-answer procedures of 16.3.2 and the call release procedures of 16.3.3 apply.

### 16.3.2  Manual Hold - Clear (Re-answer)

The Clear (Re-answer) protocol outlined in section 3 and detailed below for manual hold allows the calling customer to temporarily suspend an established call and re-establish it.

### 16.3.2.1

If the originating network determines that its customer has cleared and manual hold has been invoked, it shall send a CLEAR message. Timer TO-03 shall not be started.

### 16.3.2.2

On receipt of the CLEAR message the terminating network shall not start timer TO-01.

### 16.3.2.3

If the originating network determines that its customer has re-established the call, it shall send a RE-ANSWER message,

### 16.3.3  Manual Hold - call release

After the operator has answered and manual hold has been invoked, only Bearer Release - Incoming Network Initiated procedures of section 3 shall apply.

## 16.4  Signalling Procedures - Override Service

Unless otherwise stated in this section, the procedures required to support the operator override service are common to all permitted parameter field values shown in Table 16.1.

The IUP operator override service described in this section uses the following protocols and procedures of section 3.

   a)   Request service negotiation protocol,

   b)   Request service (Operator-Customer) protocol,

   c)   Bearer Release Protocol.

As the operator override service requires the running of protocols that utilise group 7 messages (i.e. Request service) the general requirements of sub-section 3.3.4 apply. The receipt of a CONFUSION message during the running of the Request service protocol shall result in call failure.

In the case of the terminating network receiving CONFUSION, the call shall be failed by the sending to the originating network a CNA or RELEASE message in accordance with sub-section 3.2.3.1 with reason [02] "Network Termination".

In the case of the originating network receiving CONFUSION, the call shall be failed by the sending to the terminating network a RELEASE message in accordance with sub-section 3.2.4.1 or 3.2.4.2 as appropriate with reason [02] "Network Termination".

NOTE - In the case of call failures as described above it is recommended that a report is made to management.

### 16.4.1  Initial Action

Both networks follow the procedures of the Request service negotiation protocol.

### 16.4.2  Subsequent Action

Both Networks follow the procedures of the Operator - customer Protocol up to the called customer network connection status being determined (i.e. sending/receipt of ACM). Subsequent action is dependent on the status of the called customers network connection. The Operator - customer Protocol permits the operator to subsequently complete a call to an idle connection, or to offer a call to a customer already engaged on a call.

In the case of completed calls the established call procedures of section 3 apply, additionally the operator may invoke manual hold - refer to 16.3.

### 16.4.3  Transmission path connection

To enable;

   a)   the calling operator to be notified of the status of the call at relevant stages of its establishment and

   b)   bothway communication between operator and called customer at call answer (dependent on the status of the called customers network connection), the transmission paths between incoming and outgoing networks shall be connected as follows;

The backward transmission path (i.e. incoming network---> outgoing network) shall be connected by the outgoing network prior to or on receipt of the ACM from the incoming network. Backward transmission path connection within the incoming network is outside the scope of this specification.

If the operator wishes to continue the call (arranged by the sending of an OOR message to the incoming network), the forward transmission path (i.e. outgoing network---> incoming network) shall be connected by the incoming network prior to or on the sending of the ANS message to the outgoing network. Forward transmission path connection within the outgoing network is outside the scope of this specification.

### 16.4.4 Call Release

The procedures of section 3 shall apply.

### 16.4.5 Message Sequence Diagram

| Originating Network | Interconnect Route | Terminating Network |

**C7 IUP**

**Request service negotiation protocol section 3**

**Request service (Operator-customer) protocol section 3**
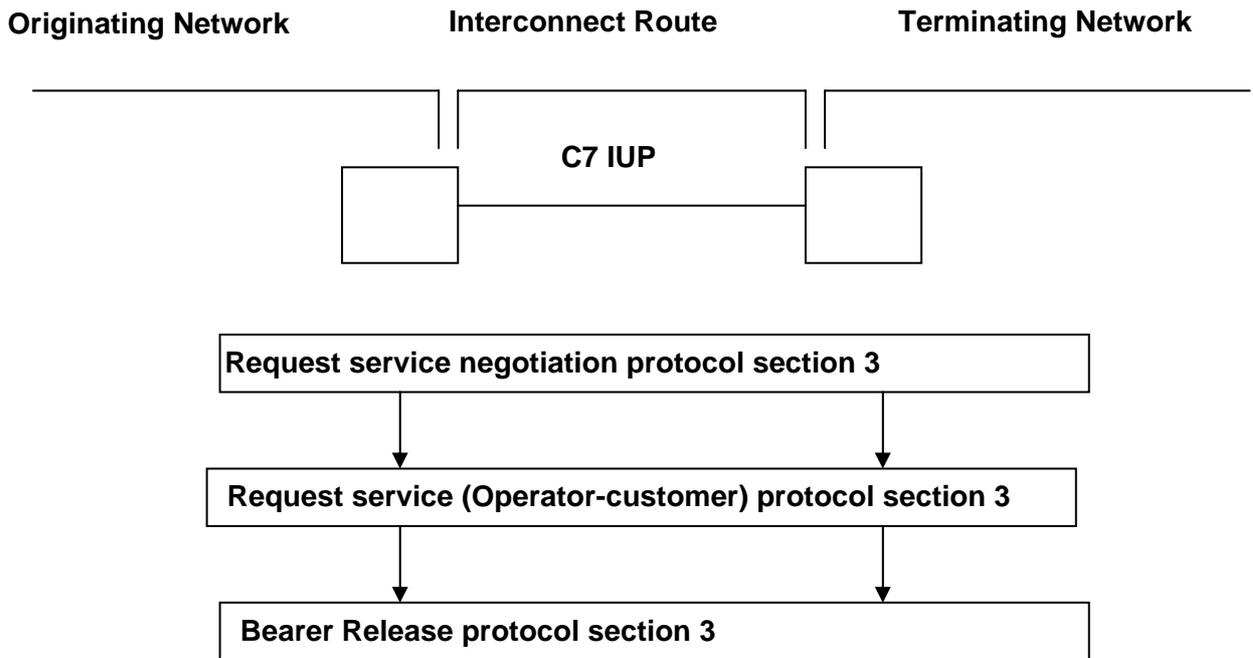
**Bearer Release protocol section 3**

FIGURE 16.1

**Override Service**

## 16.5  Signalling Procedures - Interception Service

Unless otherwise stated in this section, the procedures required to support the operator Interception Service are common to all permitted parameter field values shown in Table 16.2.

The IUP operator Interception Service described in this section uses the following Protocols and procedures of section 3:

   a)   Request service negotiation protocol,

   b)   Request service (Customer- operator) protocol,

   c)   Bearer Release Protocol.

   d)   The ACI protocol is employed as necessary to obtain additional information on the calling customer.

As the operator Interception Service requires the running of protocols that utilise group 7 messages (i.e. Request service and, possibly, ACI) the general requirements of sub-section 3.3.4 (CONFUSION message procedures) apply.

In the case of the terminating network receiving CONFUSION during the running of the Request service protocol, the call shall be failed by the sending to the originating network a CNA or RELEASE message in accordance with sub-section 3.2.3.1 with reason [02] "Network Termination".

In the case of the originating network receiving CONFUSION during the running of the Request service protocol, the call shall be failed by the sending to the terminating network a RELEASE message in accordance with sub-section 3.2.4.1 or 3.2.4.2 as appropriate with reason [02] "Network Termination".

NOTE - In the case of call failures as described above it is recommended that a report is made to management.

In the case of the terminating network receiving CONFUSION as a result of sending ACI (request) it shall either:

   a)   if the information requested is essential, fail the call by sending to the originating network a CNA or RELEASE message in accordance with sub-section 3.2.3.1 with reason [02] "Network Termination",

   or

   b)   allow the call to continue.

### 16.5.1  Initial Action

Both networks follow the procedures of the Request service negotiation protocol.

### 16.5.2  Subsequent Action

Both networks follow the procedures of the customer-operator protocol up to answer. Refer to section 3 for operation of the SASUI/ACI protocols. Once answered, the established call procedures of section 3 apply. Subsequent action is dependent on whether the operator in the terminating network determines that the call can be extended to the original required destination (in which case EXTEND CALL message is sent by the terminating network to the intercepting network). If appropriate, the COIN and FEE CHECK message may also be sent by the terminating network to the intercepting network to enable control of pay on answer type coin boxes.

### 16.5.3  Transmission path connection

The procedures of section 4 apply.

### 16.5.4  Call Release

The procedures of section 3 shall apply.
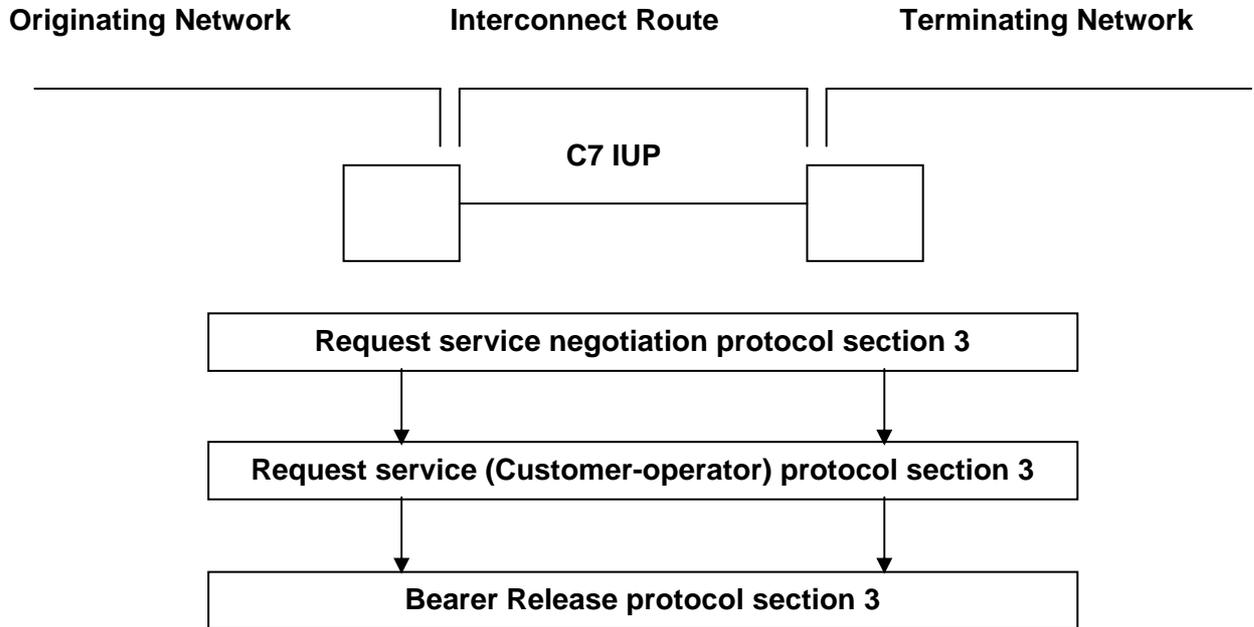
### 16.5.5  Message Sequence Diagram

**Originating Network**          **Interconnect Route**          **Terminating Network**

**C7 IUP**

| Request service negotiation protocol section 3 |
| :---: |

| Request service (Customer-operator) protocol section 3 |
| :---: |

| Bearer Release protocol section 3 |
| :---: |

FIGURE 16.2

**Interception Service**

**END OF PNO-ISC/SPEC/006 § 16**

**END OF PNO-ISC/SPEC/006**