INTERNATIONAL TELECOMMUNICATION UNION

# ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

# Q.1237
(06/2000)

SERIES Q: SWITCHING AND SIGNALLING

Intelligent Network

# Extensions to Intelligent Network Capability Set 3 in support of B-ISDN

ITU-T Recommendation Q.1237

ITU-T Q-SERIES RECOMMENDATIONS

**SWITCHING AND SIGNALLING**

| | |
|---|---|
| SIGNALLING IN THE INTERNATIONAL MANUAL SERVICE | Q.1–Q.3 |
| INTERNATIONAL AUTOMATIC AND SEMI-AUTOMATIC WORKING | Q.4–Q.59 |
| FUNCTIONS AND INFORMATION FLOWS FOR SERVICES IN THE ISDN | Q.60–Q.99 |
| CLAUSES APPLICABLE TO ITU-T STANDARD SYSTEMS | Q.100–Q.119 |
| SPECIFICATIONS OF SIGNALLING SYSTEMS No. 4 AND No. 5 | Q.120–Q.249 |
| SPECIFICATIONS OF SIGNALLING SYSTEM No. 6 | Q.250–Q.309 |
| SPECIFICATIONS OF SIGNALLING SYSTEM R1 | Q.310–Q.399 |
| SPECIFICATIONS OF SIGNALLING SYSTEM R2 | Q.400–Q.499 |
| DIGITAL EXCHANGES | Q.500–Q.599 |
| INTERWORKING OF SIGNALLING SYSTEMS | Q.600–Q.699 |
| SPECIFICATIONS OF SIGNALLING SYSTEM No. 7 | Q.700–Q.799 |
| Q3 INTERFACE | Q.800–Q.849 |
| DIGITAL SUBSCRIBER SIGNALLING SYSTEM No. 1 | Q.850–Q.999 |
| PUBLIC LAND MOBILE NETWORK | Q.1000–Q.1099 |
| INTERWORKING WITH SATELLITE MOBILE SYSTEMS | Q.1100–Q.1199 |
| **INTELLIGENT NETWORK** | **Q.1200–Q.1699** |
| SIGNALLING REQUIREMENTS AND PROTOCOLS FOR IMT-2000 | Q.1700–Q.1799 |
| BROADBAND ISDN | Q.2000–Q.2999 |

*For further details, please refer to the list of ITU-T Recommendations.*

**ITU-T Recommendation Q.1237**


**Extensions to Intelligent Network Capability Set 3 in support of B-ISDN**

**Summary**

This Recommendation describes the call model, the application protocol and the procedures for Intelligent Network capabilities associated with B-ISDN. It describes an application protocol that is fully compatible with INAP in ITU-T Q.1238. It describes SSF to SCF call control that is based on service aspect requirements and on network aspect requirements of ITU-T Q.1231.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSC Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

INTELLECTUAL PROPERTY RIGHTS

ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

**CONTENTS**

**ITU-T Recommendation Q.1237**

**Extensions to Intelligent Network Capability Set 3 in support of B-ISDN**

## 1 Scope

This Recommendation describes the call model, the application protocol and the procedures for Intelligent network capabilities associated with DSS2, B-ISUP, DSS2 carrying 64 kbit/s circuit emulated services, and B-ISUP carrying 64 kbit/s circuit emulated services.

The application protocol described in this Recommendation is fully compatible with INAP in ITU-T Q.1238, and contains extensions to ITU-T Q.1238. The SSF to SCF call control is based on service aspect requirements and on network aspect service requirements of ITU-T Q.1231.

## 2 References

The following ITU-T Recommendations and other references contain provisions, which through references in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

– ITU-T Recommendation Q.931 (1998), *ISDN user-network interface layer 3 specification for basic call control*.

– ITU-T Recommendation Q.932 (1998), *Digital subscriber signalling sstem No. 1 − Generic procedures for the control of ISDN supplementary services*.

– ITU-T Recommendation Q.1231 (1999), *Introduction to Intelligent Network Capability Set 3*.

– ITU-T Recommendations Q.1238, Q.1238.1 (2000), Q.1238.2 (2000), Q.1238.3 (2000), Q.1238.4 (2000), Q.1238.5 (2000), Q.1238.6 (2000), Q.1238.7 (2000), *Interface Recommendation for Intelligent Network Capability Set 3*.

– ITU-T Recommendation Q.1290 (1998), *Glossary of terms used in the definition of Intelligent Networks*.

– ITU-T Recommendation Q.2610 (1999), *Usage of cause and location in B-ISDN user part and DSS2*.

– ITU-T Recommendation Q.2723.1 (1996), *B-ISDN user part − Support of additional traffic parameters for sustainable cell rate and quality of service*.

– ITU-T Recommendation Q.2725.1 (1996), *B-ISDN user part, Support of negotiation during connection setup*.

– ITU-T Recommendation Q.2725.2 (1996), *B-ISDN user part – Modification procedures*.

– ITU-T Recommendation Q.2761 (1999), *Functional description of the B-ISDN user part (B-ISUP) of signalling system No. 7*.

– ITU-T Recommendation Q.2762 (1999), *General functions of messages and signals of the B-ISDN user part (B-ISUP) of signalling system No. 7*.

– ITU-T Recommendation Q.2763 (1999), *Signalling system No. 7 B-ISDN user part (B-ISUP) – Formats and codes*.

–    ITU-T Recommendation Q.2769.1 (2000), *Support of number portability information across B-ISUP*.

–    ITU-T Recommendation Q.2931 (1995), *Digital subscriber signalling system No. 2 – User network interface (UNI) layer 3 specification for basic call/connection control*.

–    ITU-T Recommendation Q.2932.1 (1996), *Digital subscriber signalling system No. 2 – Generic functional protocol: Core functions*.

–    ITU-T Recommendations Q.2961, Q.2961.1 (1995), Q.2961.2 (1997), Q.2961.3 (1997), Q.2961.4 (1997), Q.2961.5 (1999), Q.2961.6 (1998), *Digital subscriber signalling system No. 2 – Additional Traffic Parameters*.

–    ITU-T Recommendation Q.2962 (1998), *Digital subscriber signalling system No. 2 – Connection characteristics negotiation during call/connection establishment phase*.

–    ITU-T Recommendation Q.2963.1 (1999), *Peak cell rate modification by the connection owner*.

## 3    Definitions

The definitions of ITU-T Recommendation Q.1238 and ITU-T Recommendation Q.1290 are applicable. See also parameter descriptions in this Recommendation.

## 4    Abbreviations

This Recommendation uses the following abbreviations:

| | |
|---|---|
| AAL | ATM Adaptation Layer |
| ACM | Address Complete Message |
| AESA | ATM End System Address |
| ATM | Asynchronous Transfer Mode |
| BCSM | Basic Call State Model |
| B-ISDN | Broadband Integrated Services Digital Network |
| B-ISUP | Broadband ISDN User Part |
| BTC | Broadband Transfer Capability |
| CBR | Constant Bit Rate |
| CCF | Call Control Function |
| CDVT | Cell Delay Variation Tolerance |
| CPCS-SDU | Common Part Convergence Sublayer – Service Data Unit |
| CPH | Call Party Handling |
| CS | Call Segment |
| CSCV | Call Segment Connection View |
| DP | Detection Point |
| DSS2 | Digital Subscriber Signalling System 2 |
| EDP | Event Detection Point |
| FRL | Facility Restriction Level |

| FSM | Finite State Machine |
|---|---|
| GIT | Generic Identifier Transport |
| IAA | IAM Acknowlegment Message |
| IAM | Initial Address Message |
| ISDN | Integrated Services Digital Network |
| PIC | Point in Call |
| QoS | Quality of Service |
| SCF | Service Control Function |
| SLPI | Service Logic processing Program Instance |
| SS No. 7 | Signalling System No. 7 |
| SSCS | Service Specific Convergence Sublayer |
| SSF | Service Switching Function |
| TDM | Time Division Multiplex |
| TDP | Trigger Detection Point |
| TNS | Transit Network Selection |
| UNI | User Network Interface |
| USI | User Service Information |
| VCI | Virtual Channel Identifier |
| VPCI | Virtual Path Connection Identifier |

## 5 Relationship of this Recommendation to ITU-T Q.1238

ITU-T Q.1237 describes IN services in a B-ISDN environment. It includes descriptions for implementing existing narrow-band IN services and new broadband IN services over a network that uses B-ISDN signalling. In cases of ambiguities between ITU-T Q.1237 and ITU-T Q.1238, the operations, procedures, formats, and codes of ITU-T Q.1238 take precedence.

ITU-T Q.1237 is based on the functional model, call model, procedures, operations, formats, and codes of ITU-T Q.1238. It includes some enhancements to reflect uniqueness of B-ISDN. The enhancements can be categorized into two major topics:

1) Call Model;
2) DP Criteria and Triggers.

## 5.1 Call model

ITU-T Q.1237 includes one major change to the Q.1238 call model to accommodate broadband connection modification, as well as minor changes to the information available in the originating and terminating Points in Call (PICs).

The call model is changed to accommodate the connection modification capability that is included in B-ISDN signalling. This is accomplished through the addition of a subordinate call state model in both the originating and terminating BCSMs. The subordinate state model assumes that the BCSM creates a subordinate process when it enters the O/T_Active PIC. This subordinate process reflects the status of the broadband bearer connection.

The call model is also changed to reference information available in broadband signalling for each PIC. Implementation of existing narrow-band IN services in B-ISDN is based on the existence of specific narrow-band signalling information in the ITU-T Recommendations for broadband signalling. Implementation of broadband IN services is based on the extensions of signalling information in ITU-T Recommendations to support broadband bearers. Therefore, references are included in an informative appendix to provide broadband references for both narrow-band and broadband signalling information.

### 5.1.1 Examples of specific narrow-band information

Narrow-band Bearer Capability is carried in DSS2 and in B-ISUP, providing an instance of DSS1 Bearer Capability and of ISUP User Service Information (USI) in broadband signalling.

Forward Narrow-band Interworking Indicator and the National/International Call Indicator are carried in B-ISUP, providing an instance of ISUP Forward Call Indicators in broadband signalling.

Many parameters carried in B-ISUP are identical to parameters provided in ISUP. The Forward Global Virtual Network Service (Forward GVNS), Backward GVNS parameters are examples, as are Called Directory Number and Number Portability Forward Information.

Other narrow-band signalling information, relating to Supplementary Services and to Call Progress, is included in broadband signalling by reference. The Notification indicator, carried in ITU-T Q.2931 DSS2, cites ITU-T Q.932 as the example for the content to be included in its information field. The Progress Indicator, carried in ITU-T Q.2931, cites ITU-T Q.931 to define the content to be included in its information field. The Facility information element referenced in ITU-T Q.2932 may be used to invoke service features described in ITU-T Q.932. For example, the content carried in the Facility information element may include Keypad Facility, Display, Feature Activation, Feature Indication, and Facility Information.

### 5.1.2 Examples of specific broadband information

New IN capabilities include recognition and selection of Broadband Transfer Capabilities, ATM Traffic Descriptors, Quality of Service classes and ATM Adaptation Layer characteristics of importance to the services carried over the connection. These new IN capabilities are added to capabilities described in ITU-T Q.1238 for IN services in a narrow-band environment.

### 5.2 Detection point criteria and triggers

ITU-T Q.1237 includes changes to Q.1238 Detection Point Criteria that reflect the change in bearer from Time Division Multiplex (TDM) to Asynchronous Transfer Mode (ATM). Specific B-Channel Identifier detection point criteria, Channel_Setup_PRI trigger, and Shared_Interoffice_Trunk trigger, are changed to acknowledge implementation over a broadband bearer.

ITU-T Q.1237 includes new detection point criteria and new triggers for specific attributes of the broadband connection. Examples are ATM Traffic Descriptor, Quality of Service, and ATM Adaptation Layer.

Descriptions, such as Facility Group, Facility Group Member are changed to reflect the attributes of the broadband bearer. For example, Facility Group is used to indicate Virtual Facilities (Virtual Paths, Virtual Channels) rather than physical channels.

### 6 CCF/SSF model

### 6.1 CCF/SSF FE model

The overview of the CCF/SSF Functional Entity model in 6.1/Q.1238.2 applies.

## 6.2 CCF/SSF functional model components

The functional model described in 6.2/Q.1238.2 applies.

## 6.3 Basic call manager (BCM)

The descriptions for Basic Call Manager in 6.3/Q.1238.2 apply.

### 6.3.1 BCSM model

The descriptions for the BCSM Model in 6.3.1/Q.1238.2 apply.

Any discrepancies in the Point in Call (PIC) descriptions in 6.3.2, between ITU-T Q.1238 and this Recommendation, should be resolved using the descriptions in ITU-T Q.1238.

### 6.3.2 BCSM description

The descriptions for the BCSM in 6.3.2/Q.1238.2 apply, however, the call model is enhanced to accommodate the B-ISDN bearer modification capability. B-ISDN (DSS2 and B-ISUP) signalling allows the modification of the connection characteristics by the originating party during the active phase of the call.

For B-ISDN, the BCSM creates a subordinate process when it encounters the O_Answer_DP at the O_Active PIC. This subordinate process models the status of the bearer connection. The process initiates in the O_Bearer_Active PIC. It transitions to O_Bearer_Modify PIC on receipt of a modification request. It returns to the O_Bearer_Active PIC through the O_Modify_Result DP when the modification request is acknowledged or rejected, or when modification fails. The subordinate process is removed when the O-BCSM transitions to the O_Disconnect DP, or on any transition of the O-BCSM to exception. The T-BCSM for the bearer is modelled equivalently.

#### 6.3.2.1 Originating BCSM

The originating half of the BCSM corresponds to that portion of the BCSM associated with the originating party (see Figure 1).
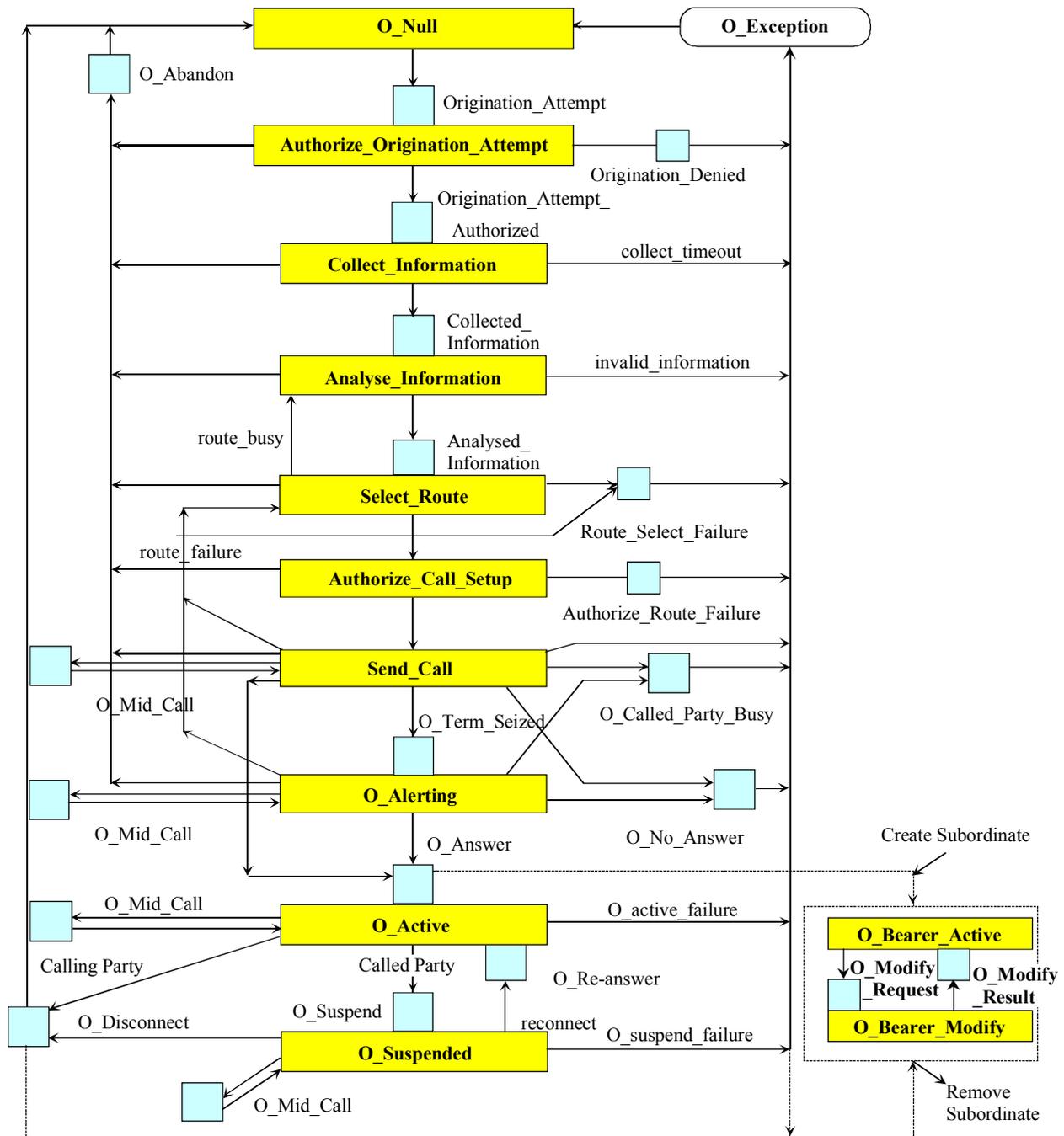
**Figure 1/Q.1237 – Originating BCSM for ITU-T Q.1237: Basic set of transitions**

The following information is available at all PICs in the O-BCSM:

– Calling Party Class of Service (where locally available, e.g. subscriber profile including calling party category information).

– Call Reference (where locally assigned in the switch).

– Terminal Type – See ITU-T Q.1290. The SCF uses this to determine the most appropriate form of user-interaction to use (e.g. in-band announcements). This information may only be available at originating local exchanges.

– Calling Party Facility Restriction Level (FRL) – The permission level associated with an incoming facility, e.g. trunk line.

–   Calling Party BGID (Business Group Identity) – The Basic Business Group or Multiswitch Business Group Identity of the calling party, e.g. group-based services.

–   Charge Number – See ITU-T Q.1290. This information is available at the CCF/SSF for a B-ISDN DSS2 interface served by the CCF/SSF and may be available for a SS No. 7 B-ISUP interface.

–   Class of Service – See ITU-T Q.1290.

–   Calling Party's Carrier, Carrier Identification Code, Carrier Selection; Route Index; and Travelling Class Mark.

–   Calling Facility Group – See ITU-T Q.1290. Available on DSS2 or SS No. 7 B-ISUP interfaces.

–   Calling Facility Group Member – See ITU-T Q.1290. Available on DSS2 or SS No. 7 B-ISUP interfaces.

The above information applies in addition to Signalling Information received from the signalling interface and from the peer T_BCSM. The Signalling Information depends on the signalling interface arrangement applied: DSS2, or B-ISUP, etc.

The descriptions for each of the PICs in the originating half of the BCSM are described below:

### 6.3.2.1.1   O_Null

**Entry event**: Disconnect and clearing of a previous call (DPs: O_Disconnect and O_Abandon), or default handling of exceptions by CCF/SSF completed.

**Functions**: Interface (DSS2/B-ISUP) is idled (no call exists, no call reference exists, etc.). Supervision is being provided.

**Information available**: After detecting the Origination Attempt event, it is assumed that the CCF/SSF has information received from the signalling interface arrangement (e.g. as a Setup service request primitive is received due to a DSS2 Setup, B-ISUP IAM) available associated with the originating call portion, with restrictions as noted. If the CCF/SSF determines that the origination is denied, the cause of the failed authorization is also known.

Any information relating to switch-based features that have already been invoked for the call will also be available.

**Exit events**:

–   Indication of desire to place outgoing call (e.g. Q.2931 setup message, B-ISDN-UP IAM message). (DP: Origination_Attempt).

–   The following exception exit events are applicable to the O_Null PIC:

    For this PIC, if the call encounters one of these exceptions during O_Null PIC processing, the exception event is not visible because there is no corresponding DP.

–   The O_Abandon occurs when the calling party disconnects.

    For example, this event can result from one of the following:

    •   the CCF/SSF receives a call clearing message from a caller served by a DSS2 B-ISDN interface;

    •   the CCF/SSF receives a Release Message from an SS No. 7 B-ISUP interface.

**Corresponding Q.2931 call state**: O_Null (N0).

### 6.3.2.1.2   Authorize_Origination_Attempt

**Entry event**: An indication is available that the originating terminal needs to be authorized. (DP: Origination_Attempt).

**Functions:**

– The originating terminal rights should be checked using the calling party's identity and service profile. The authority/ability of the party to place the call with given properties (e.g. bearer capability, connection restrictions) is verified. The types of authorization to be performed may vary for different types of originating resources (e.g. for DSS2 interfaces vs. B-ISUP interfaces).

– Other features, such as some content retained in service profiles, which might be required during this PIC are not described in the Q.1237 BCSM.

**Information available**: After detecting the Origination_Attempt_Authorized event, it is assumed that the SSP has the same information available associated with the originating call portion as it did after detecting the Origination_Attempt event in the O_Null PIC.

– Information as per the O_Null PIC.

– Authorization result – If the SSP determines that the origination is denied, the cause of the failed authorization is also known.

**Exit events:**

– An indication is received that the authorization is successful. The O_BCSM moves to the Collect_Information PIC (DP: Origination_Attempt_Authorized).

– The O_Abandon event occurs when an indication of clearing or of originating party abandon is received. This event causes call processing to move to the O_Abandon DP.

– An indication is received that the call origination is denied. The O_BCSM moves to the Origination_Denied DP.

### 6.3.2.1.3    Collect_Information

**Entry event**: Authority/ability to place outgoing call verified
(DP: Origination_Attempt_Authorized).

**Functions**:

– Initial information (e.g. service codes, prefixes, address digits, connection information) is collected from originating party. Information is examined according to addressing plan to determine end of collection in the case of overlap sending. No further action may be required if an *en bloc* signalling method is in use (e.g. an ISDN DSS2 user using *en bloc* signalling, or an incoming SS No. 7 B-ISUP interface).

– The CCF/SSF shall be able to support subsequent digit collection according to trigger criteria assigned before sending the query. For example, if a feature code (e.g. *64) is entered, the CCF/SSF may:

  • collect digits according to the normal dialling plan; or

  • collect a variable number of digits.

**Information available**: After the CCF/SSF determines that information collection is complete, it is assumed that the CCF/SSF has the following information available associated with the originating call portion:

– Information as per the O_Null PIC.

– Collected Information – As obtained from Setup Service Request primitive.

**Exit events**:

– Availability of complete initial information from originating party. (This event may have already occurred in the case of *en bloc* signalling, in which case the waiting duration in this PIC is zero.) (DP: Collected_Info).

– The following exception exit events are applicable to this PIC: Collect_Failure. The Collect_Failure event encompasses events such as CollectTimeout, CollectInfoFailure and InvalidInformation.

– The CollectTimeout event is detected when enough information to process the call was not received by the CCF/SSF before a normal timer expires. For an SS No. 7 B-ISUP or DSS2 interface, this event corresponds to the IAM or SETUP not containing the information necessary to process the call. There may be no timing involved, unless overlap sending is used by ISDN services carried across a DSS2 interface (Note 1).

– The CollectInfoFailure event is detected when the CCF/SSF is unable to perform the information collection due to a lack of switch resources.

– The InvalidInformation event occurs when the information received from the caller is not valid, for instance the information received includes an invalid address or invalid information.

– The O_Abandon event occurs when an indication of clearing or of originating party abandon is received. This event causes call processing to move to the O_Abandon DP.

**Comment**: Some digit analysis is required to determine the end of dialling in the case of N-ISDN overlap sending in DSS2. However, it is assumed that this analysis may be modelled as separable from the rest of digit analysis, which occurs in the Analyse_Information PIC. There is no intention to specify an implementation. However, a switch should externally present the separable view described for closed numbering plans (Note 2).

In the case of ISDN *en bloc* sending in DSS2, the receipt of a SETUP message detected at the Origination_Attempt_Authorized DP causes the BCSM to pass through the Collect_Information PIC to the Collected_Information DP, without further processing in the Authorized_Origination_Attempt PIC. Note that the BCSM transitions to Collected_Information DP when the initial information package/dialling string is received from the calling party – this occurs when enough information is received to proceed with call processing (e.g. as in the case of ISDN overlap sending). Specifically, for the digit by digit collection case, if the Collected_Information DP is armed as a Trigger detection Point-Request (TDP-R), the SSF sends the query, i.e. an initialling DP request (i.e. Initial DP or CollectedInformation operation) to the SCF when enough is received to determine if the TDP criteria is met. It suspends BCSM processing but will collect further digits. It is network operator specific to determine when complete information is available (Note 3).

NOTE 1 – B-ISDN terminal equipment (B-TE) shall use *en bloc* sending in B-ISDN, implying that complete address information is included in the SETUP message. In order to allow terminal equipment designed for N-ISDN to be connected to the B-ISDN via a terminal adapter, the DSS2 protocol also supports overlap sending (see ITU-T Q.2931).

NOTE 2 – This separable view is provided by supporting distinct DPs. The Collected_Information DP is used after digit collection and the Analysed_Information DP is used after the rest of the digit analysis.

NOTE 3 – In some networks, it may not be possible for the CCF/SSF to determine when the called number information is complete. Therefore, TDP criteria for Collected_Information DP may be met in such networks before the called number information is complete.

**Corresponding Q.2931 call state**: Call Initiated (N1), and (optionally) Overlap Sending (N2).

### 6.3.2.1.4    Analyse_Information

**Entry event**: Availability of complete initial information from originating party (DP: Collected_Information) or Route Busy event reported from the Select Route PIC.

**Function**: Information being analysed and/or translated according to dialling plan to determine routing address and call type (e.g. local exchange call, transit exchange call, international exchange call), as well as service subscription and access parameters. In the case that the SSF has received a

list of destination addresses in a Connect or AnalyseInformation operation, the CCF/SSF shall use the next destination address in the list.

The following provides details as to when the next destination address/Route should be tried under each condition.

| | |
|---|---|
| Parameters Received: | DestinationRoutingAddress |
| Result: | Busy or No Answer |
| Processing Order: | Destination address1 |

Since no forwarding condition is specified, only the first destination address is tried.

| | |
|---|---|
| Parameters Received: | DestinationRoutingAddress, ForwardingCondition |
| Result: | Busy/No Answer |
| Processing Order: | Destination address1 |
| | Destination address2 |
| | Destination address3 |

So long as the forwarding condition is met, the next destination address is tried.

| | |
|---|---|
| Parameters Received: | RouteList, DestinationRoutingAddress |
| Result: | No route out of local switch (busy) |
| Processing Order: | Route1, destination address1 |
| | Route2, destination address1 |
| | Route3, destination address1 |

No other destination addresses need be tried since there are no routes out of the switch.

| | |
|---|---|
| Parameters Received: | RouteList, DestinationRoutingAddress |
| Result: | Route busy is found to be at a switch other than local switch |
| Processing Order: | Route1, destination address1 |

No other routes need be tried since the local route is successful, but a busy condition was encountered elsewhere. No other destination addresses are tried since forwarding condition does not apply.

| | |
|---|---|
| Parameters Received: | RouteList, DestinationRoutingAddress |
| Result: | No answer received |
| Processing Order: | Route1, destination address1 |

No other routes need be tried since the route is successful, but a no answer condition was encountered.

No other destination addresses are tried since forwarding condition does not apply.

Only after the appropriate destination addresses/Routes have been tried will the call move onto the O_Called_Party_Busy DP, O_No_Answer DP, or Route_Select_Failure DP as appropriate.

One of the results of processing in this PIC is determination of routing address:

i)       called party number only (called party number is served by the SSF);

ii)      called party number and route index, where the route index is a pointer to an outbound path on which to route an outgoing call attempt (called party number is served by another SSF);

iii)     called party number and route index, where the route index is a pointer to a list of outbound paths on which to route an outgoing call attempt (called party number is served by another SSF).

**Information available**: After the CCF/SSF determines the information has been analysed, it is assumed that the CCF/SSF has the following information available associated with the originating call portion:

–        Information as per the O_Null PIC.

–        Analysis Results (of the Collected Information) – as described in the examples below.

From a DSS2 interface that supports 64 kbit/s based ISDN circuit mode services, this consists of one or more of the following:

–        Called Party Number.

–        Numbering Plan Indicator – See Q.2931 Numbering Plan Indicator signalling information.

–        Type Of Call – See ITU-T Q.1290.

–        Carrier – See ITU-T Q.1290.

–        Carrier Identification Code – See ITU-T Q.1290.

         Available for Internetwork carrier calls.

–        Carrier Selection – See ITU-T Q.1290.

         Available for Inter Serving Area ID carrier calls.

–        Route List – See ITU-T Q.1290.

–        Collected Information – Access Code within a CDP, Feature Code, Feature Activation, Prefix, Carrier Access Code/Carrier Identification Code, Collected Address Information/Digits – as described under the Collect_Information PIC.

From a SS No. 7 B-ISUP interface that supports ISUP parameters, this consists of one or more of the following:

–        Charge Number – as defined in the O_Null PIC (for a SS No. 7 B-ISUP Interface).

–        Called Party Number and Numbering Plan Indicator (as defined above for DSS2 interface).

–        Carrier Identification – available for Inter Serving Area ID carrier calls.

–        Carrier Selection – See ITU-T Q.1290. Available for Inter Serving Area ID carrier calls.

–        Originating Line Information – See ITU-T Q.1290. Available for Inter Serving Area ID carrier calls.

–        Route Index – See ITU-T Q.1290.

         Available if this call does not terminate on this CCF/SSF.

From B-ISDN DSS2 and SS No. 7 B-ISUP interfaces, this consists of one or more of the following:

–        Collected Information as defined for the Collect_Information PIC.

–        Service Profile and Access Parameter Information. (Reflected in the information returned in analysis results if provisioned and enabled on the interface.)

–        Analysis Results of the collected information. Following are examples of analysis results that may be returned in the connect operation:

    •    VPCI/VCI to be returned to the connection originator in a DSS2 Call Proceeding Message or in a B-ISUP IAM Acknowledge message.

    •    Cell Rate to be forwarded toward the destination in a DSS2 SETUP or a B-ISUP IAM. Also used at the O_Answer DP as the Cell Rate possibly returned to the connection originator in the DSS2 CONNECT message or B-ISUP ANSwer Message.

    •    Called Party Address (routing address) to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.

    •    Called Party Subaddress to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.

- Calling Party Subaddress to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.

- Transit Network Selection parameter to be forwarded toward the destination in a B-ISUP IAM.

- Calling Party Address to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.

- Calling Party Subaddress to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.

- Cumulative Transit Delay to be included in a DSS2 SETUP or a B-ISUP IAM.

- Cause value to be returned to the connection originator in a Release Message.

**Exit events:**

– Availability of routing address and nature of address. This event causes call processing to move to the Analysed_Information DP.

– The following exception exit events are applicable to this PIC: InvalidInformation. The InvalidInformation event occurs when the information received from the caller is not valid and no further treatment (e.g. routing of the call to an announcement in case of a wrong dialled number) can be applied to the call, for instance in case the information received violates the dialling plan in force.

– The O_Abandon event occurs when an indication of clearing or of originating party abandon is received. This event causes call processing to move to the O_Abandon DP.

**Comments**: Note that routing address does not necessarily mean that the final physical route has been determined (e.g. route list has not been searched, directory number has not yet been translated to physical port address), though this may be the case (e.g. when routing to a specific path).

**Corresponding Q.2931 call state**: Not applicable.

### 6.3.2.1.5 Select route

**Entry events**: Availability of routing address and call type. (DP: Analysed_Information) or route busy event reported from the Send_Call or O_Alerting PICs.

**Functions:**

– Routing address and connection parameters are being interpreted. The VPCI and VCI for the originating access segment are selected. The next route on the terminating side is being selected. This may involve sequentially searching a route list, translating a directory number into physical port address, etc.

  NOTE – In a broadband environment, the switching system may select path (VPI) and channel (VCI) in two directions of the connection:

  1) toward the originating end system, and

  2) toward the terminating end system or toward the transit network.

– When the entry event is the route failure event from the Send_Call PIC (see below), the CCF/SSF must first check the Route Failure Condition 1, Route Failure Condition 2, or Route Failure Condition 3 as defined under the Send_Call PIC exit events. If these conditions are true, then the call shall proceed to the Analyse Information PIC in order to use the next Destination Address.

If these three conditions are not met, then depending on the location in the network where the route is busy, the action is one of the following:

– If the route selected for the connection is busy at this switch, the CCF/SSF attempts to route the connection on the next route that has been specified for the connection (when a route list is being searched or alternate routes are specified by the SCF). Call processing moves to the Analyse_Information PIC when one of two conditions occurs: all private-facility trunk groups have been tried and routing over a public facility is allowed, or routing to a particular intra or internetwork carrier has been tried and an alternate carrier is allowed.

– If all of the routes (private and public) have been tried and no route is available, the Route_Select_Failure event is detected.

– If route busy is detected at another switch, an indication of this condition may be received via SS No. 7 signalling. In this case, a Route_Select_Failure event is detected.

**Information available**: After the CCF/SSF determines the route has been selected, it is assumed the CCF/SSF has the following information available and associated with the originating portion of the connection:

For a DSS2 interface that supports 64 kbit/s based ISDN circuit mode services or for a SS No. 7 B-ISUP interface that supports ISUP parameters:

– Information as per the O_Null PIC.

– Analysis Results – See description in the Analyse_Information PIC.

– Routing Information – When more than one route has been specified for the connection (either by the SCF or as part of the information stored at the CCF/SSF), the CCF/SSF remembers what routes have been tried for this connection and which route to select next.

For a DSS2, or for a SS No. 7 B-ISUP interface:

– Information as per the O_Null PIC.

– Service Profile and Access Parameter Information – See description in the Analyse_Information PIC.

– Analysis Results – See description in the Analyse_Information PIC.

– Routing Information – When more than one route has been specified for the connection (either by the SCF or as part of the information stored at the CCF/SSF), the CCF/SSF remembers what routes have been tried for this connection and which route to select next.

**Exit events:**

– Route Selected event.

– Unable to select a route (e.g. unable to determine a correct route, no more routes on route list) or indication from the terminating half BCSM that call cannot be presented to the terminating party (e.g. network congestion).This event causes call processing to move to the Route_Select_Failure DP. The event indication received from T_BCSM that causes call processing to move to the O_Route_Select_Failure DP depends upon the event reason (cause value) as defined according to ITU-T Q.1238.2 "O_BCSM: Mapping Cause value to DP".

– The route busy event leading to the Analyse_Information PIC as described above, or the following four conditions are met:

a) unable to select a route (e.g. unable to determine a correct route, no more routes on route list) or indication from the terminating half BCSM that call cannot be presented to the terminating party (e.g. network congestion);

b) the forwarding condition is busy, as specified by the ForwardingCondition parameter;

c)   the route was determined by switch translations at the Analyse_Information PIC;

d)   there are more destination addresses left to try.

Route busy is a non-IN transition which is part of a basic call. This is needed in case the CCF/SSF needs to process a list of destination addresses. These destination addresses can be returned in a Connect or Analyse_Information message. Upon being unable to select a route, the route busy BCSM transition returns to the Analyse_Information PIC to analyse the next destination address in the list.

–   Originating party abandons call (DP: Abandon).

### 6.3.2.1.6   Authorize_Call_Setup

**Entry event**: Route Selected event.

**Function**: The authority of the calling party to obtain this particular connection is verified.

**Information available**: After the CCF/SSF determines the call setup has been authorized, it is assumed the CCF/SSF has the following information available with restrictions as noted.

For a DSS2 interface that supports 64 kbit/s based ISDN circuit mode services or for a SS No. 7 B-ISUP interface that supports ISUP parameters:

–   Information as per the O_Null PIC.

–   Analysis Results – See description in the Analyse_Information PIC.

–   Routing Information – See description in the Select_Route PIC.

For a DSS2, or for a SS No. 7 B-ISUP interface:

–   Information as per the O_Null PIC.

–   Service Profile and Access Parameter Information – See description in the Analyse_Information PIC.

–   Analysis Results – See description in the Analyse_Information PIC.

–   Routing Information – See description in Select_Route PIC.

**Exit events:**

–   Call Setup Authorized event. The Call Setup Authorized event occurs when the authority to obtain the connection is verified.

–   The O_Abandon event occurs when an indication of clearing or originating party abandon is received. This event causes connection processing to move to the O_Abandon DP.

–   The Authorization Failure event occurs when the authority to obtain the connection is denied (e.g. service not subscribed, access facility limitations exceeded, business group restriction mismatch). This event causes a BCSM transition to the Authorize_Route_Failure DP.

### 6.3.2.1.7   Send_Call

**Entry event**: Call Setup Authorized event.

**Functions**: The CCF/SSF sends an indication of the desire to set up a call to the specified Called Party ID to the terminating call portion.

For a DSS2 interface that supports 64 kbit/s based ISDN circuit mode services or for a SS No. 7 B-ISUP interface that supports ISUP parameters:

The information that may be passed to the terminating call portion is for example: Charge Number; Calling Party ID; Calling Party BGID; Calling Party Category; Bearer Capability; Called Party ID; Calling Party Subaddress; Called Party Subaddress; Forward GVNS, Carrier; Route Index; Carrier Identification Code; Carrier Selection; and TCM. Other feature-information not used by the

processing modelled by this PIC (e.g. call forwarding, generic name, and business group information) may also be passed to the terminating call portion.

For a DSS2 or for a SS No. 7 B-ISUP interface:

The information that may be passed to the terminating call portion is described in the Analyse_Information PIC.

For a DSS2 caller, during the processing that this PIC models, the CCF/SSF returns a CALL PROCeeding message. For a B-ISDN B-ISUP connection, the SSF/SCF sends an IAM acknowledgment message (IAA).

**Information available**: After the CCF/SSF determines the call has been delivered (to the terminating half), it is assumed the CCF/SSF has the following information available with restrictions as noted.

For a DSS2 interface that supports 64 kbit/s based ISDN circuit mode services or for a SS No. 7 B-ISUP interface that supports ISUP parameters:

– Information as per the O_Null PIC.

– Analysis Results – See description in the Analyse_Information PIC.

– Routing Information – See description in the Select_Route PIC.

– Feature Activation Information – See description below:
  A service feature request is received from the originating party: e.g. feature activator.

For a DSS2, or for a SS No. 7 B-ISUP interface:

– Information as per the O_Null PIC.

– Service Profile and Access Parameter Information – See description in the Analyse_Information PIC.

– Analysis Results – See description in the Analyse_Information PIC.

– Routing Information – See description in Select_Route PIC.

**Exit events:**

– A route failure event is detected when:

  i)   an indication of a T_Busy event specifying route busy; or

  ii)  a Call Rejected event specifying route busy (received when the route is found to be busy at a switch other than the local switch) is received from the terminating call portion;

  iii) the following four conditions are met, hereafter called Route Failure Condition 1:

      a)  an indication of a T_Busy event specifying route busy (received when the route at the local switch is found to be busy) is received from the terminating call portion (presentation failure event from the Present Call DP);

      b)  the forwarding condition is busy, as specified by the ForwardingCondition parameter;

      c)  the route was determined by switch translations at the Analyse_Information PIC;

      d)  there are more destination addresses left to try;

  iv)  the following four conditions are met, hereafter called Route Failure Condition 2:

      a)  a Call Rejected event specifying route busy (received when the route is found to be busy at a switch other than the local switch) is received from the terminating call portion (presentation failure event from the Present Call PIC);

      b)  the forwarding condition is busy, as specified by the ForwardingCondition parameter;

c)   the route was determined by the switch translations at the Analyse_Information PIC;

d)   there are more destination addresses left to try;

v)   the following four conditions are met, hereafter called Route Failure Condition 3:

a)   O_Called_Party_Busy event or O_No_Answer event occurs (as specified below);

b)   the forwarding condition is met, as specified by the ForwardingCondition parameter;

c)   there are more destination addresses left to try.

NOTE – The Route_Failure event takes precedence over the O_Called_Party_Busy and O_No_Answer events.

In all five cases, the originating call portion returns to the Select_Route PIC, if this event is not detected at a DP (e.g. more CDPNs left to try).

Otherwise this event causes call processing to move to the O_Route_Select_Failure DP or O_Called_Party_Busy DP [e.g. User Busy, Subscriber absent (not reachable) or O_No_Answer DP or O_Exception]. Which DP depends upon the event reason (cause value) as defined according to ITU-T Q.1238.2 "O_BCSM: Mapping Cause value to DP".

–   An O_Answer event occurs when an indication of a T_Answer event is received from the terminating call portion. This occurs in reaction to a DSS2 CONNECT or to a B-ISUP Answer message. This event causes call processing to move to the O_Answer DP.

–   An O_Term_Seized event occurs when an indication of a call accepted event is received from the terminating call portion. In B-ISDN DSS2 this occurs, for example, when a call is offered to the interface with a SETUP message and the call setup timer T303 is initiated. The destination exchange sends a Call Progress message toward the originating exchange or an ALERTING message to the Calling User. If T303 expires and no response is received, the switch retransmits the SETUP message, and re-initializes T303. In this case, the calling party receives an alerting message, however, the called party has not accepted the call. When the O_Term_Seized event occurs, the treatment applied depends on the originating access type.

–   A service feature request is received from the originating party: e.g. feature activator in a FACILITY message (DP: O_Mid_Call).

For a call originating from a B-ISDN DSS2 interface, the caller also receives an ALERTing message or under certain conditions a PROGress message containing progress indicator information set to "in-band information or pattern now available".

For SS No. 7 B-ISUP, an Address Complete Message (ACM) is sent.

–   The O_No_Answer event, which is an IN event, occurs. That is, it can only occur when an O_No_Answer trigger is assigned and detected or when requested by a RequestReportBCSMEvent. If the O_No_Answer timer expires or an indication of the T_No_Answer event is received before an O_Answer event is detected (i.e. before the called party answers), the CCF/SSF reports the event to the SCF. The event indication received that causes call processing to move to the O_No_Answer DP depends upon the event reason (cause value) as defined according to ITU-T Q.1238.2 "O_BCSM: Mapping Cause value to DP".

–   The O_Called_Party_Busy event occurs when an indication of a T_Busy event specifying user busy is received from the terminating portion of the call (i.e. network-determined-user-busy). This event also occurs when an indication of a Call Rejected event specifying user busy (i.e. user-determined-user-busy, user not reachable) is received from the terminating portion of the call. In addition to these busy events, "Call Rejected" conditions are also treated as O_Called_Party_Busy events. In this case, the terminating portion of the call is cleared. The events that cause call processing to move to the O_Called_Party_Busy DP

depend on the event reason (cause value) as defined according to the "O_BCSM: Mapping Cause Value to DP" in ITU-T Q.1238.2.

– The O_Abandon event occurs when an indication of clearing or of originating party abandon is received. This event causes call processing to move to the O_Abandon DP.

**Corresponding Q.2931 call state**: Outgoing Call Proceeding (N3).

### 6.3.2.1.8    O_Alerting

**Entry event**: O_Term_Seized event (DP: O_Term_Seized).

**Functions:**

– Wait for the terminating party to answer for a call originating from a B-ISDN DSS2 interface, the caller also receives an ALERTing message or, under certain conditions, a PROGress message containing progress indicator information set to "in-band information or pattern now available".

– An indication of a call progress event may be received from the terminating call portion. This may result in a call progress indication being sent backward, e.g. CPG being sent in SS No. 7 B-ISUP (if the originating access is a SS No. 7 B-ISUP interface) or an ALERTing or PROGress message being sent on a B-ISDN DSS2 interface (if the originating access is a B-ISDN interface).

**Information available**: When the CCF/SSF is in this PIC, it is assumed the CCF/SSF has the following information available and associated with the originating portion of the call:

For a DSS2 interface that supports 64 kbit/s based ISDN circuit mode services or for a SS No. 7 B-ISUP interface that supports ISUP parameters:

– Information as per the O_Null PIC.

– Analysis Results – See description in the Analyse_Information PIC.

– Routing Information – See description in the Select_Route PIC.

– Feature Activation Information – See description below:
A service feature request is received from the originating party: e.g. ISDN feature activator.

For a DSS2, or for a SS No. 7 B-ISUP:

– Collected Information as defined for the Collect_Information PIC.

– Service Profile and Access Parameter Information – See description in the Analyse_Information PIC.

– Analysis Results – See description in the Analyse_Information PIC.

– Routing Information – See description in Select_Route PIC.

**Exit events:**

– The O_Answer event occurs when an indication of a T_Answer event is received from the terminating portion of the call (e.g. Q.2931 Connect message received, B-ISUP Answer message received). This event causes call processing to move to the O_Answer DP (DP: O_Answer). When the O_Answer event occurs, the treatment applied is described in the Send_Call PIC.

– A service feature request is received from the originating party: e.g. in a facility information element or in a FACILITY message. (DP: O_Mid_Call).

– A route failure event is detected when:

i) the following conditions are met, hereafter called Route Failure Condition 3:

a) O_Called_Party_Busy event or O_No_Answer event occurs (as specified below);

b) the forwarding condition is met, as specified by the ForwardingCondition parameter;

c) there are more destination addresses left to try.

NOTE – The Route Failure event takes precedence over the O_Called_Party_Busy and O_No_Answer events.

In this case, the originating call portion returns to the Select_Route PIC if this event is not detected at a DP (e.g. more CDPNs left to try). Otherwise this event causes call processing to move to the O_Route_Select_Failure DP [e.g. User Busy, Subscriber absent (not reachable) or O_No_Answer DP or O_Exception] dependent upon the event reason (cause value) as defined according to the "O_BCSM: Mapping Cause value to DP" in ITU-T Q.1238.2.

– The O_No_Answer event from this PIC is the same as the O_No_Answer event defined as an Exit Event from the Send_Call PIC. That is, the event indication received that causes call processing to move to the O_No_Answer DP depends upon the event reason (cause value) as defined according to "O_BCSM: Mapping Cause value to DP" in ITU-T Q.1238.2.

– From this PIC, the O_Called_Party_Busy event occurs either:

i) when a Call Rejected event specifying user busy is received; or

ii) when an indication of a Call Rejected event not specifying busy is received from the terminating call portion (as described in the Send_Call PIC).

In addition, for a call to a B-ISDN DSS2 user, after the SETUP message is offered and an ALERTing message has been received (i.e. the terminating call portion is in the T_Alerting PIC), the B-ISDN DSS2 user may reject the call. This Call Rejected event is treated as an O_Called_Party_Busy event by the originating call portion (DP: O_Called_Party_Busy).

The event that causes call processing to move to the O_Called_Party_Busy DP depends upon the event reason (cause value) as defined according to "O_BCSM: Mapping Cause value to DP" in ITU-T Q.1238.2.

– The O_Abandon event occurs when an indication of clearing or of originating party abandon is received. This event causes call processing to move to the O_Abandon DP.

**Corresponding Q.2931 call state**: Call Delivered (N4).

### 6.3.2.1.9   O_Active

**Entry event**: Indication from the terminating half BCSM that the call is accepted and answered by terminating party (DP: O_Answer).

**Functions**: In this PIC several processes may be initiated:

– Connection established between originating and terminating party. Message accounting/charging data may be being collected. Call supervision is being provided.

– The called party may be put on hold and returned to the active phase by a service logic.

– The called party may be put on hold by a service logic and when the calling party disconnects, the calling party can be reconnected to the held call by the Reconnect operation. The calling user receives appropriate information (e.g. alerting) and a reconnection timer is applied.

– The calling party may request Modification of the connection. The called user receives a Modification Request. The calling user receives appropriate information (e.g. Modify Acknowledge) and a reconnection timer is applied.

**Information available**: Once the CCF/SSF has received an indication from the terminating half BCSM that the call has been answered, it is assumed the CCF/SSF has the following information available and associated with the originating portion of the call:

For a DSS2 interface that supports 64 kbit/s based ISDN circuit mode services or for a SS No. 7 B-ISUP interface that supports ISUP parameters:

– Information as per the O_Alerting PIC.

– Feature Activation – A service or feature request from the originating party (e.g. in a facility information element or a FACILITY message) (O_Mid_Call DP).

For a DSS2 or for a SS No. 7 B-ISUP interface:

– Information as per the O_Alerting PIC.

– Connection Modification – A request to change the connection parameters by the connection originator (O_Modify_Request DP).

**Exit events**:

– A service/service feature request is received from a party (e.g. a feature activator, or a HOLD or RETRIEVE from the originating party only, in a facility information element or a FACILITY message). The detection of this event causes call processing to move to the O_Mid_Call DP.

– A disconnect indication is received from the terminating party via the terminating half BCSM. This event causes call processing to move to the O_Suspend DP. A disconnect timing is associated with this BCSM transition.

– A disconnect indication (e.g. Q.2931 disconnect message, SS No. 7 B-ISUP release message) is received from the originating party. This event causes call processing to move to the O_Disconnect DP.

– An indication of expiration of the reconnection timer is received (O_Exception).

– A connection failure occurs (O_Exception).

– A RESTART message is received (O_Exception).

**Comments:**

– If originating party abandons call while suspended at O_Answer DP a transition to DP: O_Abandon shall occur.

– Disconnect treatment and timing is different for call attempts originating from B-ISDN DSS2 and B-ISUP interfaces.

**Corresponding Q.2931 call state**: Active (N10).

Q.2931 call states corresponding to disconnect: Release indication (N12) and Release request (N11).

### 6.3.2.1.10 O_Suspended

**Entry event**: A suspend indication is received from the T_BCSM when the terminating party has disconnected (e.g. DSS2 RELEASE message, DSS2 RESTART message, B-ISUP RELease message, B-ISUP Reset message, B-ISUP SUSpend message) (DP: O_Suspend).

**Functions:**

– The connection between the originating and terminating party is maintained and depending on the incoming network connection, appropriate backward signalling takes place.

   • In case that a disconnect indication is received from the T_BCSM, this PIC is immediately exited to the O_Disconnect DP without any action. As an option, the call can be continued for an appropriate period in order to offer follow-on initiated by O_Mid_Call DP.

   • If the re-answer indication from the T_BCSM is received, the originating and terminating parties are reconnected.

- Other features which might be required during this PIC are not described in this IN Capability Set BCSM.

– The called party may be put on hold and returned to the active phase by a service logic.

– The called party may be put on hold by a service logic and when the calling party disconnects, the calling party can be reconnected to the suspended call by the Reconnect operation. The calling user receives appropriate information (e.g. alerting) and a reconnection timer is applied. The timer may have been started in the active phase.

**Information available**: It is assumed that the information available in this PIC is the same as the information available in the O_Active PIC.

**Exit events:**

– Connection to the terminating party is resumed. The O_BCSM returns to the O_Active PIC. This event causes call processing to move to the O_Re-answer DP.

– A service feature request is received from the originating party, e.g. feature activator of facility or a new reply from calling party (Reconnect procedure). The detection of this event causes call processing to move to the O_Mid_Call DP.

– A disconnection indication is received from the originating party. This event causes call processing to move to the O_Disconnect DP.

– A disconnection indication is received from the terminating party. This event causes call processing to move to the O_Disconnect DP.

– An indication of expiration of the timer waiting for re-answer request is received from the T_BCSM. This event causes call processing to move to the O_Disconnect DP.

– A trigger at O_Mid_Call is not initiated during an appropriate period (DP: O_Disconnect).

– An indication of expiration of the calling party reconnection timer is received (O_Exception).

– An exception event is encountered (O_Exception).

NOTE 1 – A Call Retention timer may exist. Disconnect treatment and timing is different for call reconnection, call suspension and call retention.

NOTE 2 – After the release of the outgoing connection, the originating party may initiate another call, e.g. follow-on calling.

### 6.3.2.1.11  O_Exception

**Entry event**: An exception condition is encountered (as described above for each PIC).

**Functions**: Default handling of the exception condition is being provided. This includes general actions necessary to ensure no resources remain inappropriately allocated, such as:

– If any relationships exist between the SSF and SCF(s), send an error information to the SCF(s) closing the relationships and indicating that any outstanding call handling instructions will not run to completion (Note).

– If an SCF previously requested that call parameters be provided at the end of the call (see the CallInformationRequest operation), these should be included in the error information.

– The CCF/SSF should make use of vendor-specific procedures to ensure release of resources within the CCF/SSF so that bearer connection resources, signalling connection resources, and other resources are made available for new calls.

NOTE – Depending on the connection view state this should be handled in the physical plane via an ABORT protocol procedure to close the relationship (i.e. close the TCAP transaction) or via the sending of an EntityReleased operation with the relevant cause. This indicates in both cases that any outstanding operations on the corresponding entity (leg or CS) will not be run to completion.

**Information available**: Once the CCF/SSF has determined an exception condition has occurred, it is assumed the CCF/SSF has information available as to when the exception within the PIC occurred.

**Exit event**: Default handling of the exception condition by the CCF/SSF completed (BCSM transition to O_Null PIC).

### 6.3.2.2 Terminating BCSM

The terminating half of the BCSM corresponds to that portion of the BCSM associated with the terminating party (see Figure 2).



**Figure 2/Q.1237 – Terminating BCSM for ITU-T Q.1237: Basic set of transitions**

The following information is available at all PICs in the T-BCSM:

– Same information as associated with the originating BCSM is assumed to be available. See subclause defining the information available at all PICs in the O_BCSM.

– Called Party Class of Service (where locally available, e.g. subscriber profile including called party category information).

– Call Reference (where locally assigned in the switch).

- Called Party Terminal Type – See ITU-T Q.1290. The SCF uses this to determine the most appropriate form of user-interaction to use (e.g. in-band announcements). This information may only be available at terminating local exchanges.

- Called Party Facility Restriction Level (FRL) – The permission level associated with an outgoing facility, e.g. trunk line.

- Called Party BGID (Business Group Identity) – The Basic Business Group or Multiswitch Business Group Identity of the called party, e.g. group-based services.

- Service Compatibility ID – See ITU-T Q.1290. This information is received from the originating call portion and may be enhanced by CCF/SSF.

- Charge Number – See ITU-T Q.1290. This information is available at the CCF/SSF for a B-ISDN DSS2 interface served by the CCF/SSF and may be available for a SS No. 7 B-ISUP interface.

- Called Party's Carrier, Carrier Identification Code, Carrier Selection; Route Index; and Travelling Class Mark.

- Called Facility Group – See ITU-T Q.1290. Available on DSS2 or SS No. 7 B-ISUP interfaces.

- Called Facility Group Member – See ITU-T Q.1290. Available on DSS2 or SS No. 7 B-ISUP interfaces.

The above information applies in addition to Signalling Information received from the signalling interface and from the peer O_BCSM. The Signalling Information depends on the signalling interface arrangement applied: DSS2, B-ISUP, etc. The descriptions for each of the PICs in the terminating half of the BCSM are described below.

NOTE – See subsequent subclause description on "BCSM Indications for the CS-3 Call Model" for more information concerning PICs.

### 6.3.2.2.1    T_Null

**Entry event**: Disconnect and clearing of a previous connection (DPs: T_Disconnect or T_Abandon), or default handling of exceptions by CCF/SSF completed.

**Function**: Interface (DSS2/B-ISUP) is idled (no connection exists, no connection reference exists, etc.). Supervision is being provided.

**Information available**: Once the CCF/SSF has detected the Termination_Attempt event, it is assumed that the CCF/SSF has the information corresponding to the Signalling Information received from the signalling interface (e.g. as a Setup service request message is received like DSS2 Setup, B-ISUP IAM) available and associated with the terminating portion of the call.

The above information applies in addition to the information available at all PICS in the T_BCSM.

NOTE 1 – Information associated with the originating portion of the call as per the Send_Call PIC is assumed to be available – this information is received from the originating call portion, i.e. the peer O_BCSM.

Any information relating to switch-based features that have already been invoked for the call will also be available.

**Exit events:**

- Indication of incoming call received from originating half BCSM
  (DP: Termination_Attempt).

- The following exception exit event is applicable to this PIC: T_Abandon. If the call encounters T_Abandon during PIC processing, the exception event is not visible because there is no corresponding DP.

NOTE 2 – The T_Abandon event occurs when an indication of call disconnection is received from the originating portion of the call before the call has been answered, i.e. when the calling party disconnects.

For example, this event can result from one of the following:

– the CCF/SSF receives a call clearing message from a caller served by a B-ISDN interface;

– SSF receives a Release Message from a SS No. 7 B-ISUP interface.

**Corresponding Q.2931 call state**: Null (N0).

### 6.3.2.2.2    Authorize_Termination_Attempt

**Entry event**: Termination_Attempt event (DP: Termination_Attempt).

**Function**: Verifies the authority to route this connection to the terminating access, e.g. check business group restrictions, restricted incoming access or bearer capability compatibility.

**Information available**: It is assumed that the CCF/SSF has the same information available for the terminating connection portion after the Termination_Attempt_Authorized event is detected as it does when the Termination_Attempt event is detected in the T_Null PIC.

– Information as per the T_Null PIC.

– Service Profile and Access Parameter Information of the Terminating Access, if provisioned and enabled.

– Authorization result – If the CCF/SSF determines that the termination attempt is denied, the cause of the failed authorization is also known.

**Exit events:**

– Termination_Attempt_Authorized event. This event occurs when the switch has verified the authority to terminate the connection to the terminating access
(DP: Termination_Attempt_Authorized).

– The Termination Denied event occurs when the authority to route this connection to the terminating user is denied. (This causes a BCSM transition to the Termination_Denied DP.)

– The T_Abandon event occurs when an indication of clearing is received from the originating portion of the connection (DP: T_Abandon).

### 6.3.2.2.3    Select facility

**Entry event**: Termination_Attempt_Authorized event (DP: Termination_Attempt_Authorized) or a B-ISDN failure occurs causing a re-attempt in SS No. 7 B-ISUP or DSS2. The failure in the Present_Call can be caused by a timer expiry upon sending the first Initial Address Message (IAM) or the first SETUP message.

**Function**: The busy/idle status of the terminating access is determined.

– For a connection terminating to a B-ISUP interface, network-determined user busy is the detection of one or more of the following cause values in an Incoming Resources Rejected Request:

  • Resource Unavailable – Unspecified: There are no idle Signalling Identification Values.

  • No VPCI/VCI Available: There is no VPCI or VCI available.

  • User Cell Rate Not Available: There is a lack of bandwidth for the connection.

– For a call terminating to a B-ISDN DSS2 interface, network-determined user busy is the detection of one or more of the following conditions:

  • VPCI/VCI Not Available: There are no VPCIs or VCIs available to allocate to the connection.

- Requested VPCI/VCI Not Available: The requested VPCI or VCI is not available to allocate to the connection.
- Quality of Service unavailable: Requested Quality of Service or End-to-End Transit Delay not acceptable.
- Resources Unavailable – Unspecified: Requested Cell rate in the ATM Traffic Descriptor is not available.

**Information available**: When the Facility_Selected and Available event is detected, it is assumed the following information is available and associated with the terminating portion of the call with restrictions as detailed below:

– Information as per the Authorize_Termination_Attempt PIC. In particular, the authorized and available VPCI/VCI for the terminating interface must be known.

– Facility Group – See ITU-T Q.1290. For calls routed out of this CCF/SSF, this identifies the Virtual Path(s) that has been selected on which to route the call.

– Facility Group Member – See ITU-T Q.1290. For calls out of this CCF/SSF, this identifies the Virtual Channel that has been selected on which to route the call.

**Exit events:**

– Facility_Selected_and_Available event: This event occurs when the terminating access is not busy (i.e. an idle resource [e.g. VPCI/VCI, call reference or channel ID] could be found). This event causes call processing to move to the Facility_Selected_and_Available DP.

– A T_Busy event occurs when the terminating access is busy (as defined above). The T_busy event may also be detected as a result of certain maintenance actions. The event indication that causes call processing to move to the T_Busy DP depends upon the event reason (cause value) as defined according to "T_BCSM: Mapping Cause value to DP" in ITU-T Q.1238.2.

After detecting T_Busy, if IN service logic is not needed on the call and no switch-based features apply, an indication of the T_Busy event describing the type of busy (e.g. user or network) is passed to the originating call portion. If a terminating feature acts on the T_Busy event and changes the event (e.g. as in the call Waiting feature), the event is not passed to the Originating BCSM.

– The T_Abandon event occurs when an indication of clearing or of originating party abandon is received from the originating portion of the call. This event causes call processing to move to the T_Abandon DP.

#### 6.3.2.2.4 Present Call

**Entry event**: Facility_Selected_and_Available event (DP: Facility_Selected_and_Available).

**Function**: Terminating resource informed of incoming call (e.g. Q.2931 Setup message, B-ISUP IAM message).

**Information available**: When the Call_Accepted event is detected, it is assumed the following information is available and associated with the terminating portion of the call with restrictions as detailed below:

– Information as per the T_Null PIC.

– Facility Group, Facility Group Member – See description in the Select Facility PIC.

– Information regarding the connection – This information includes whether the call is end-to-end SS No. 7 or not, and whether the originating access is ISDN or B-ISDN as determined by the presence of Narrow-band and Broadband Bearer Capability Information Elements or Parameters in the DSS2 SETUP or B-ISUP IAM.

– Service Profile and Access Parameter Information of the Terminating Access, if provisioned and enabled.

**Exit events:**

– Terminating party is being alerted (e.g. Q.2931 ALERTING message, B-ISUP ACM message). This event causes call processing to move to the Call_Accepted DP.

– Call is accepted and answered by terminating party (e.g. Q.2931 Connect message received, B-ISUP answer message received). This event causes call processing to move to the T_Answer DP.

– The T_No_Answer event occurs when the terminating party does not answer before the No_Answer timer expires or when a B-ISDN user rejects the call with an explicit "no answer" indication. An indication of T_No_Answer event is passed to the originating half of the BCSM. The event indication received that causes call processing to move to the T_No_Answer DP depends upon the event reason (cause value) as defined according to the "T_BCSM: Mapping Cause value to DP" in ITU-T Q.1238.2.

– The T_Abandon event occurs when an indication of clearing or of originating party abandon is received from the originating portion of the call. This event causes call processing to move to the T_Abandon DP.

– A timer expiry upon sending the second DSS2 SETUP message or the first Initial Address Message (IAM) in B-ISUP (SS No. 7 failure). This event causes call processing to move to the Select Facility PIC.

– Presentation Failure exception event may happen if the call cannot be presented by the T-Busy event.

– The T-Busy event occurs if the call cannot be presented due to a B-ISDN user determined busy, B-ISUP release message with busy cause, not reachable subscriber condition; this event is notified to the originating call portion (send Call PIC). The event indication that causes call processing to move to the T_Busy DP depends upon the event reason (cause value) as defined according to "T_BCSM: Mapping Cause value to DP" in ITU-T Q.1238.2. Otherwise this event causes call processing to move to the T_Exception.

**Corresponding Q.2931 call state**: Call present (N6).

### 6.3.2.2.5    T_Alerting

**Entry event**: Terminating party is being alerted of incoming connection request (DP: Call_Accepted).

**Function**: An indication is sent to the originating half BCSM that the terminating party is being alerted. Continued processing of call setup (e.g. retransmit of SETUP message in DSS2) is taking place. Waiting for the call to be answered by terminating party.

**Information available**: Once the terminating party is being alerted of the incoming call, it is assumed that the CCF/SSF has the following information available and associated with the terminating portion of the call:

– Information as per the Present_Call PIC.

– Called Party's Indicator and the Charge Indicator may also be available.

**Exit events**:

– Connection is accepted and answered by terminating party (e.g. Q.2931 CONNect message received, B-ISUP answer message received). This event causes call processing to move to the T_Answer DP.

– The following exception exit events are applicable to this PIC: call rejected, T_No_Answer, T_Busy and T_Abandon.

– Call rejected exception event may happen when a B-ISDN DSS2 user rejects a call while being alerted.

–    The T_No_Answer event occurs when the terminating party does not answer before the No_Answer timer expires or when a user rejects the call with an explicit "no answer" indication. An indication of T_No_Answer event is passed to the originating half of the BCSM. The event indication received that causes call processing to move to the T_No_Answer DP depends upon the event reason (cause value) as defined according to "T_BCSM: Mapping Cause value to DP" in ITU-T Q.1238.2.

–    The T_Busy event occurs if the call cannot be presented, due to e.g. B-ISDN DSS2 user determined busy, B-ISUP release message with busy cause, not reachable subscriber, etc. This event causes call processing to move to the T_Busy DP and is notified to the originating call portion (Alerting PIC). The events that cause call processing to move to the T_Busy DP depends upon the event reason (cause value) as defined according to "T_BCSM: Mapping Cause value to DP" in ITU-T Q.1238.2. Otherwise this event causes call processing to move to the T_Exception.

–    The T_Abandon event occurs when an indication of clearing or of originating party abandon is received from the originating portion of the call. This event causes call processing to move to the T_Abandon DP.

**Comment**: For terminations to SS No. 7 B-ISUP interfaces, this PIC is entered upon the receipt of an address complete (ACM) message.

**Corresponding Q.2931 call states**: Call received (N7), Connect request (N8), and Incoming Call Proceeding (N9).

### 6.3.2.2.6    T_Active

**Entry event**: Connection is accepted and answered by terminating party (e.g. Q.2931 Connect message received, B-ISUP answer message received) (DP: T_Answer).

**Functions**: In this PIC several processes may be initiated:

–    An indication is sent to the origination half BCSM that the terminating party has accepted and answered the call. Connection established between originating and terminating party. Call supervision is being provided.

–    The calling party may be put on hold and returned to the active phase by a service logic.

–    The calling party may be put on hold by a service logic and when the called party disconnects, the called party can be reconnected to the held call by the Reconnect operation. The called user receives appropriate information (e.g. alerting) and a reconnection timer is applied. The timer may have been started in the active phase. The calling party may request modification of the connection. The called party receives a request to modify the connection, and returns a MODIFY ACKNOWLEDGE in DSS2 or a MODify Confirm in B-ISUP. In DSS2 the called party sets a timer and awaits receipt of CONNECTION AVAILABLE.

**Information available**: Once the call is accepted and answered by the terminating party, it is assumed the following information is available and associated with the terminating portion of the call with restrictions as noted.

For a DSS2 interface that supports 64 kbit/s based ISDN circuit mode services or for a SS No. 7 B-ISUP interface that supports ISUP parameters:

–    Information as per T_Alerting.

–    Feature Activation – See description below. A service feature request is received from a party: [e.g. in a Q.2932 FACILITY message and Q.932 ISDN feature activator, and Q.932 HOLD or RETRIEVE message (for a terminating party only)].

For a DSS2 or for a SS No. 7 B-ISUP interface:

– Information from the Authorize_Termination_Attempt PIC, specifically, the Cell Rate possibly returned to the connection originator in the DSS2 CONNECT message or B-ISUP ANSwer Message.

– Connection Modification – A connection modification request from the originating party (e.g. DSS2 Q.2963.1 MODIFY REQUEST, B-ISUP Q.2725.2 MODify request) (T_Modify_Request DP). Note that connection modification is available only to the connection owner, i.e. the connection originator.

**Exit events:**

– A service/service feature request is received from a party (e.g. feature activator, Q.931 HOLD or RETRIEVE message from a terminating party only, in a Facility information element or in a FACILITY message). The detection of this event causes call processing to move to the T_Mid_Call DP.

– A disconnect indication (e.g. Q.2931 disconnect message, SS No. 7 B-ISUP release message) is received from the terminating party. This event causes call processing to move to the T_Suspend DP.

– A disconnect indication is received from the originating party via the originating half BCSM. This event causes call processing to move to the T_Disconnect DP.

– An indication of expiration of the reconnection timer is received (T_Exception).

– A connection failure occurs (T_Exception).

– A RESTART message is received (T_Exception).

**Comments:**

– If originating party abandons call while suspended at T_Answer DP a transition to DP: T_Abandon shall occur.

– Disconnect indications and treatment are asymmetrical in the way disconnect timing is applied.

**Corresponding Q.2931 call state**: Active (N10).

**Q.2931 call states corresponding to T_Disconnect**: Release indication (N12), and Release request (N11).

### 6.3.2.2.7    T_Suspended

**Entry event**: An indication is received from the outgoing network that the terminating party has disconnected (e.g. DSS2 Release message, or B-ISUP RELease message) (DP: T_Suspend).

**Function**: The physical resources associated with the call remain connected.

According to the received indication the following applies:

– A suspend indication is sent to the originating half BCSM.

– For a SS No. 7 B-ISUP interface or a B-ISDN DSS2 interface, in the case that a disconnect indication (e.g. Q.2931 release message, SS No. 7 B-ISUP release message) is received from the terminating party, this PIC is immediately exited to the T_Disconnect DP without any action.

– In the following case, the timer is started and the call waits for re-answer request from the terminating party:

  • For a SS No. 7 B-ISUP interface, in case of receiving network initiated suspend message.

If re-answer request (e.g. SS No. 7 B-ISUP resume message) is received from the terminating party before the timer expires, the originating and terminating parties are reconnected.

NOTE – Both a Call Resume timer and a Call Retention timer may exist in this PIC. IN implementations may use a single timer for both conditions.

**Information available**: While in the T_Suspended PIC, it is assumed that the CCF/SSF has the following information available and associated with the terminating call portion.

– Information as per the T_Active PIC.

**Exit events:**

– The terminating party re-answers or a resume message is received before the timer expires; the T_BCSM returns to the T_Active PIC (DP: T_Re-answer).

– The timer expires (DP: T_Disconnect).

– A disconnection indication is received from the terminating party (DP: T_Disconnect).

– A disconnection indication is received from the originating party (DP: T_Disconnect).

– An exception event is encountered (T_Exception).

### 6.3.2.2.8    T_Exception

**Entry event**: An exception condition is encountered (as described above for each PIC).

**Functions**: An indication of the exception condition is sent to the originating half BCSM. Default handling of the exception condition is being provided. This includes general actions necessary to ensure no resources remain inappropriately allocated, such as:

– If any relationships exist between the SSF and SCF(s), send an error information to the SCF(s) closing the relationships and indicating that any outstanding call handling instructions will not be run to completion (Note).

– If an SCF previously requested that call parameters be provided at the end of the call (see the CallInformationRequest operation), these should be included in the error information.

The CCF/SSF should make use of vendor-specific procedures to ensure release of resources within the CCF/SSF so that DSS2 interfaces, B-ISUP interfaces, and other resources are made available for new calls.

NOTE – Depending on the connection view state this should be handled in the physical plane via an ABORT protocol procedure to close the relationship (i.e. close the TCAP transaction) or via the sending of an EntityReleased operation with the relevant cause. This indicates in both cases that any outstanding operations on the corresponding entity (leg or CS) will not be run to completion.

**Information available**: Once the CCF/SSF has determined an exception condition has occurred, it is assumed the SSF/CF has information available as when the exception within the PIC occurred.

**Exit event**: Default handling of the exception condition by CCF/SSF completed (BCSM transition to T_Null PIC).

### 6.3.2.3    Subordinate Process for Bearer Modelling

For B-ISDN, the BCSM creates a subordinate process to model the status of the bearer connection.

The subordinate process is created in the O/T_Bearer_Active PIC, when the BCSM encounters the O/T_Answer_DP. The subordinate process is removed when the O-BCSM transitions to the O/T_Disconnect DP, or on any transition of the O/T-BCSM to exception. For the detailed set of O_BCSM transitions described in ITU-T Q.1238, the subordinate process must be removed on any transition from O_Mid_Call DP to any PIC other than O_Active or O_Suspend.

### 6.3.2.3.1 O_BCSM Subordinate Process

The subordinate process transitions to O_Bearer_Modify PIC on receipt of a modification request. It returns to the O_Bearer_Active PIC through the O_Modify_Result DP when the modification request is acknowledged, or rejected, or when modification fails.

### 6.3.2.3.1.1 O_Bearer_Active

**Entry event**: Request from O_BCSM to create subordinate process on transition of call to O_Active state (DP: O_Answer).

**Functions:**

– Both call and bearer are monitored in the active state.

**Exit events:**

– Indication of desire to update (modify) the connection characteristics is received (e.g. reception of a MODIFY request from originating user) (DP: O_Modify_Request).

– A service feature request is received from the originating party (DP: O_Mid_Call), and the call transitions to any PIC other than O_Active and O_Suspend.

– An exception event is encountered in the O-BCSM (O_Exception).

– Connection released in the O_BCSM by remote party (DP: O_Suspend), and the O-BCSM transitions to disconnect (DP: O_Disconnect).

– Connection released in the O_BCSM by originating party (DP: O_Disconnect).

### 6.3.2.3.1.2 O_Bearer_Modify

**Entry event**: Indication of desire to update (modify) the connection characteristics is received (e.g. reception of a MODIFY request from originating user) (DP: O_Modify_Request).

**Functions:**

– The authority/ability of the calling party to modify the connection is verified. If updating is impossible or not permitted, the active state is resumed (transition to O_Active PIC via O_Modify_Result DP), and a message is sent to the originating party (e.g. MODIFY reject).

– If the modification is possible, an appropriate message is sent to the next relay.

– An answer (e.g. MODIFY acknowledgement/confirm/reject) is awaited. If a reject message is obtained, the connection is resumed to the active state, and a message is sent to the originating party (e.g. MODIFY reject). If an acknowledgement message is received, local network resources are modified and the modification is confirmed, both to the originating party and to the other end of the connection (MODIFY confirm).

**Exit events:**

– Connection update completed successfully (DP: O_Modify_Result-modifyAcknowledge).

– Connection update unauthorized or unsuccessful (DP: O_Modify_Result-modifyReject).

– Connection modification failure (DP: O_Modify_Result-modifyReject).

– A service feature request is received from the originating party (DP: O_Mid_Call), and the call transitions to any PIC other than O_Active and O_Suspend.

– An exception event is encountered in the O_BCSM (O_Exception).

– Connection released in O_BCSM by remote party while attempting modification (DP: O_Suspend), and the O-BCSM subsequently transitions to disconnect (DP: O_Disconnect).

– Connection released in O_BCSM by originating party while attempting modification (DP: O_Disconnect).

### 6.3.2.3.2 T_BCSM Subordinate Process

The subordinate process transitions to T_Bearer_Modify PIC on receipt of a modification request. It returns to the T_Bearer_Active PIC through the T_Modify_Result DP when the modification request is acknowledged, or rejected, or when modification fails.

#### 6.3.2.3.2.1 T_Bearer_Active

**Entry event**: Request from T_BCSM to create subordinate process on transition of call to T_Active state (DP: T_Answer).

**Function:**

– Both call and bearer are monitored in the active state.

**Exit events:**

– Indication of desire to update (modify) the connection characteristics is received (e.g. reception of a MODIFY request from originating user) (DP: T_Modify_Request).

– An exception event is encountered in the T_BCSM (T_Exception).

– Connection released by connection originator in the T_BCSM while attempting modification (DP: T_Disconnect).

– Connection released by terminating party in the T_BCSM during modification request (DP: T_Suspend), that subsequently transitions to disconnect (DP: T_Disconnect).

#### 6.3.2.3.2.2 T_Bearer_Modify

**Entry event**: Indication of desire to update (modify) the connection characteristics is received (e.g. reception of a MODIFY request from originating user) (DP: T_Modify_Request).

**Functions:**

– The authority/ability of the calling party to modify the connection is verified. If updating is impossible or not permitted, the active state is resumed (transition to T_Active PIC via T_Modify_Result DP), and a message is sent to the originating party (e.g. MODIFY reject).

– If the modification is possible, an appropriate message is sent to the next relay.

– An answer (e.g. MODIFY acknowledgement/confirm/reject) is awaited. If a reject message is obtained, the connection is resumed to the active state, and a message is sent to the originating party (e.g. MODIFY reject). If an acknowledgement message is received, local network resources are modified and the modification is confirmed, both to the originating party and to the other end of the connection (MODIFY confirm).

**Exit events:**

– Connection update completed successfully (DP: T_Modify_Result-modifyAcknowledge).

– Connection update unauthorized or unsuccessful (DP: T_Modify_Result-modifyReject).

– Connection modification failure (DP: T_Modify_Result-modifyReject).

– An exception event is encountered in the T_BCSM (T_Exception).

– Connection released in the T_BCSM by connection originator while attempting modification (DP: T_Disconnect).

– Connection released by terminating party in the T_BCSM during modification request (DP: T_Suspend), that subsequently transitions to disconnect (DP: T_Disconnect).

### 6.3.3 BCSM resume points and BCSM transitions

The descriptions of resume points and transitions in 6.3.3/Q.1238.2 apply.

### 6.3.4 BCSM indications for the call model

The descriptions of BCSM indications in 6.3.4/Q.1238.2 apply.

### 6.3.5 Mapping from cause to DP

A normative mapping between signalling release cause values and DPs is defined by Mapping Tables, i.e. the table covers only cause values received by the basic call signalling.

The tables are based on the Call States. In some cases the mapping of a particular cause value to a DP depends on the PIC in which the release message is received. This is indicated where appropriate by notes.

This Mapping from Cause value to DP as indicated in ITU-T Q.1238 applies. The tables below show mapping for only B-ISDN cause codes. The tables for O-BCSM and respective T_BCSM are normative, except where the table indicates that receipt of the cause value leads to the O/T_Exception PIC. In the latter case, network operators may decide to map some of these cause values to a specific DP.

#### 6.3.5.1 O_BCSM: Mapping table from cause to DP

A flexible mapping is provided as the DP_Route_Select Failure is used as a possible transition, e.g. the PICs Send_Call and O_Alerting. The transitions are done through an internal transition in the O_BCSM.

The following mapping of O_BCSM PICs is applied:

For ease of reference, the PICs have been categorized as follows:

- Category: Originating Call setup:

  PICs: Authorize_Origination_Attempt, Collect_Information, Analyse_Information, Select_Route, Authorize_Call_Setup.

- Category: Originating Stable Call:

  PICs: Send-Call, O_Alerting, O_Active.

- Category: Originating Call Clearing:

  PICs: O_Suspended.

See Table 1.

**Table 1/Q.1237 – O_BCSM: Mapping cause value to DP**

| No. | Reason | Originating CallSetup | Originating Stable Call (Note 1) | (Note 2) | Originating CallClearing |
|---|---|---|---|---|---|
| 35 | Requested VPCI/VCI not available | Exception | O_Called_Party _Busy | Exception | Exception |
| 36 | VPCI/VCI assignment failure | Route_Select_ Failure | Route_Select_ Failure | Exception | Exception |
| 37 | User cell rate not available | Route_Select_ Failure | Route_Select_ Failure | Exception | Exception |
| 45 | No VPCI/VCI available | Exception | O_Called_Party _Busy | Exception | Exception |
| 73 | Unsupported combination of traffic parameters | Route_Select_ Failure | Route_Select_ Failure | Exception | Exception |
| 93 | AAL parameters cannot be supported | Route_Select_ Failure | Route_Select_ Failure | Exception | Exception |
| NOTE 1 – A transition to Route_Select_Failure DP occurs directly when due to the receipt of a route failure event from the called destination (provided that no more CDPNs left to try). | | | | | |
| NOTE 2 – Transition valid for O_Active PIC only. | | | | | |

### 6.3.5.2    T_BCSM: Mapping table from cause to DP

The transitions are done through an internal transition in the BCSM.

The following mapping of T_BCSM PICs is applied:

For ease of reference, the PICs have been categorized as follows:

•        Category: Terminating Call setup:

         PICs: Authorize_Termination_Attempt, Select_Facility Present_Call, T_Alerting.

•        Category: Terminating Active Call:

         PICs: T_Active.

•        Category: Terminating Call Clearing

         PICs: T_Suspended.

See Table 2.

**Table 2/Q.1237 – T_BCSM: Mapping cause value to DP**

| No. | Reason | Terminating CallSetup | Terminating Stable Call | | Terminating CallClearing |
|-----|--------|----------------------|-----------|----------|--------------------------|
| | | | **T-Alerting** | **T-Active** | |
| 35 | Requested VPCI/VCI not available | T_Busy (Note 2) | T_Busy | Exception | Exception |
| 36 | VPCI/VCI assignment failure | Exception | Exception | Exception | Exception |
| 37 | User cell rate not available | Exception | Exception | Exception | Exception |
| 45 | No VPCI/VCI available | T_Busy (Note 2) | T_Busy | Exception | Exception |
| 73 | Unsupported combination of traffic parameters | Exception | Exception | Exception | Exception |
| 93 | AAL parameters cannot be supported | Exception | Exception | Exception | Exception |
| NOTE 1 – The transition to the indicated DP is valid only for Present_Call PIC (used in ITU-T Q.1238.2). | | | | | |
| NOTE 2 – The transition to the indicated DP is valid except for the Authorize_Termination_Attempt PIC. | | | | | |
| NOTE 3 – The following rule applies for the stable call phase: The receipt of any cause value received during the stable call phase (O_Active/T_Active) shall in such states be mapped to O/T Disconnect DP. | | | | | |

### 6.3.6 BCSM detection point

The descriptions of BCSM Detection Point in 6.3.6/Q.1238.2 apply.

### 6.3.7 DP criteria

DP criteria are conditions that must be met in order to notify the SCF that the DP was encountered. These criteria can be assigned to a DP from the viewpoint of range of effectiveness, as identified by the trigger categories.

The following categories are DP trigger categories, as applicable for a given DP:

– **Individual-based** (also denoted "subscribed or line-based")

This type of trigger category applies to each subscriber address. For example, SCF processing is invoked when a connection is originated from an address belonging to subscriber A. This criteria could be said to be specific for subscriber A.

– **Group-based**

This type of trigger category applies to a certain group of addresses or users. For example, when a connection origination from any user in a certain address group invokes SCF processing the trigger should apply to that specific address group.

This type of trigger category may also apply to selected connection identifiers (VPCI/VCI). For example, when connections originated with requests for specific connection identifiers (including "no indication" for VPCI/VCI) invoke SCF processing, the trigger should apply to all connections requesting the specific connection identifiers. This type of trigger category includes Virtual Path(s) within the definition of facility group.

This type of trigger category may also apply to selected connection parameters (e.g. Quality of Service, QoS). For example, when connections originate with requests for specific QoS invoke SCF processing, the trigger should apply to all connections requesting the specific QoS.

This type of trigger category may also apply to a particular interface to the switch (e.g. switch port; or virtual User-Network Interface, UNI). For example, when connections that originate from specific interfaces invoke SCF processing, the trigger should apply to all connections requested at that interface.

– **Switch-based** (also denoted "Office-based")

This type of trigger category applies to the entire switch. Any connections generated in the switching system will be subject to this criteria. For example, any connection which makes access to specific terminating addresses (e.g. well-known ATM addresses) is triggered and SCF processing is invoked.

The following are DP criteria for IN Capability Set for B-ISDN, as applicable for a given DP:

– Trigger assigned[1] (unconditional/conditional on other criteria);

– AAL Parameters;

– ATM Traffic Descriptor;

– ATM Cell Rate;

– Additional ATM Cell Rate;

– Alternative ATM Traffic Descriptor/Alternative ATM Cell Rate;

– Minimum Acceptable ATM Traffic Descriptor/Minimum ATM Cell Rate;

– Broadband Bearer capability;

– Addressing/Numbering Plan Identification (called party);

– Specific called party digit strings;

– Specific called party address;

– AESA for Called Party;

– Called party subaddress;

– Called party indicators;

– Charge indicator;

– Addressing/Numbering Plan Identification (calling party);

– Specific calling party digit strings;

– Specific calling party address;

– AESA for Calling Party;

– Calling party subaddress;

– Calling party Category;

– Feature codes or Escape Digits (e.g. *XX, #);

– Prefixes (e.g. 0+, 00+, 011, 01, 1+);

– Access codes (e.g. 8+) for customized numbering plan;

– Specific Connection Identifier;

– End-to-End Transit Delay;

– Maximum End-to-End Transit Delay;

_____

[1] It is possible that some DPs are always conditional.

- Propagation Delay Counter;
- QoS Class;
- CDVT descriptor;
- Generic Identifier;
- Transit Network Selection;
- Connection Modify;
- Cause (unconditional/conditional on specific cause patterns).

With respect to the DP criteria listed above, note that these DP criteria only apply to TDPs. DP criteria for Event Detection Points (EDPs) are addressed by the RequestReportBCSMEvent information flow. In addition, note that one or more DP criteria may be applicable at a given DP.

The assignment of DP criteria to a TDP and the combinations of DP criteria applicable at a given DP continue to evolve. Further DP criteria and specific assignment of DP criteria to TDPs/EDPs may evolve through future capability sets.

Note further that the assignment of DP criteria to a TDP on either an individual, group or switch basis may have an impact on the memory and real-time performance requirements of the CCF/SSF.

Note that the applicability of DP criteria at a given DP depends on when call processing information is available and how long it is retained.

If network and service providers plan to implement IN services in a multi-supplier environment, they should consider formulating such requirements to ensure consistent implementations across supplier equipment.

Such requirements should be considered carefully so as not to adversely impact memory and real-time performance aspects of CCF/SSF processing.

### 6.3.7.1 DP criteria, as applicable to a given TDP for IN Capability Set for B-ISDN carrying N-ISDN services

Narrow-band ISDN services may be implemented over a B-ISDN network by carrying ISDN signalling information in the broadband protocols. As a result, DP criteria for narrow-band services as defined in ITU-T Q.1238 may be applicable. Applicability of narrow-band DP criteria is contingent on the availability of appropriate narrow-band DSS1 or ISUP signalling information in the broadband protocol and on changes to the DP criteria descriptions to recognize the broadband bearer rather than the narrow-band bearer, e.g. connection identifier for B-ISDN rather than B-channel identifier in ISDN. A list of DP Criteria that may be available for narrow-band services is provided below as an example.

- trigger assigned (unconditional/conditional on other criteria);
- class of service;
- specific connection identifier;
- specific digit strings;
- feature codes (e.g. *XX, #);
- prefixes (e.g. 0+, 00+, 0–, 00–, 011, 01, 1+);
- access codes (e.g. 8+) for customized numbering plan;
- specific abbreviated dialling strings for customized numbering plan;
- specific calling party number strings;
- specific called party number strings;
- nature of address (e.g. subscriber significant number, national significant number, international number);

–    bearer capability;

–    feature activation/indication (unconditional/conditional on specific feature patterns);

–    facility information (unconditional/conditional on specific facility information patterns);

–    cause (unconditional/conditional on specific cause patterns);

–    USI Service Indicator value (unconditional/conditional on specific value that identifies an IN service/service feature).

### 6.3.7.2    DP criteria for IN Capability Set for B-ISDN, as applicable to a given TDP

1)    *Trigger assigned*[2] (unconditional/conditional on other criteria) – An indicator of the armed/disarmed status of a TDP assigned on an individual, group, or switch basis.

The trigger assigned criterion can be used by itself or in conjunction with other criteria at a TDP. If the trigger assigned criterion is unconditional at a TDP, then it is used by itself – no other DP criterion needs to be satisfied at the TDP before informing the SCF that the TDP was encountered. If the trigger assigned criterion is conditional at a TDP, then it is used in combination with other criteria at the TDP – all of the other DP criteria in the combination need to be satisfied before informing the SCF that the TDP was encountered.

Applies at all DPs (all DPs can be provisioned as TDPs).

2)    *AAL Parameters* – An indicator of the ATM adaptation layer and associated parameters used for the connection as defined in ITU-T Q.2931 and ITU-T Q.2763.

The ATM adaptation information is available at the Origination_Attempt DP and the Termination_Attempt DP. This criterion could be applicable at all originating and terminating DPs. Since AAL parameter information may not be analysed until the Analyse_Information PIC (except to identify AAL type in the Collect_Information PIC), this criterion could be applicable at the Analysed_Info DP and beyond. The Collected_Information DP [mandatory], Analysed_Info DP [mandatory] and all other originating DPs that may be encountered after Origination_Attempt [optional] are proposed since not all SSP suppliers may retain this information for the duration of the connection. The Termination_Attempt_Authorized DP [mandatory] and all terminating DPs that may be encountered other than Termination_Attempt_Authorized [optional] are proposed since not all SSP suppliers may retain this information for the duration of the connection.

3)    *ATM Traffic Descriptor* – An indicator of the forward and backward cell rates and associated traffic parameters for the connection as defined in ITU-T Q.2931.

The ATM traffic descriptor information is available at the Origination_Attempt DP and the Termination_Attempt DP. This criterion could be applicable at all originating and terminating DPs. Note that the forward and backward peak cell rates may be altered at the O_Mid Call DP by an attempt from the connection originator to modify the connection parameters (see ITU-T Q.2963.1). Since ATM Traffic Descriptor information may not be analysed until the Analyse_Information PIC, this criterion could be applicable at the Analysed_Info DP and beyond. The Analysed_Info DP [mandatory] and all other originating DPs that may be encountered after Origination_Attempt [optional] are proposed since not all SSP suppliers may retain this information for the duration of the connection. The Termination_Attempt_Authorized DP [mandatory] and all those terminating DPs that may be encountered other than Termination_Attempt_Authorized [optional] are proposed since not all SSP suppliers may retain this information for the duration of the connection.

_____

[2]    It is possible that some DPs are always conditional.

4)   *ATM Cell Rate* – An indicator of the forward and backward cell rates and associated traffic parameters for the connection as defined in ITU-T Q.2763.

The ATM cell rate information is available at the Origination_Attempt DP and the Termination_Attempt DP. This criterion could be applicable at all originating and terminating DPs. Note that the forward and backward peak cell rates may be altered at the O_Mid Call DP by an attempt from the connection originator to modify the connection parameters (see ITU-T Q.2725.2). Since ATM Cell Rate information may not be analysed until the Analyse_Information PIC, this criterion could be applicable at the Analysed_Info DP and beyond. The Analysed_Info DP [mandatory] and all other originating DPs that may be encountered after Origination_Attempt [optional] are proposed since not all SSP suppliers may retain this information for the duration of the connection. The Termination_Attempt_Authorized DP [mandatory] and all terminating DPs that may be encountered other than Termination_Attempt_Authorized [optional] are proposed since not all SSP suppliers may retain this information for the duration of the connection.

5)   *Additional ATM Cell Rate* – An indicator of the forward and backward cell rates and associated traffic parameters for the connection as defined in ITU-T Q.2763.

The additional ATM cell rate information is available at the Origination_Attempt DP and the Termination_Attempt DP. This criterion could be applicable at all originating and terminating DPs. Since ATM Cell Rate information may not be analysed until the Analyse_Information PIC, this criterion could be applicable at the Analysed_Info DP and beyond. The Analysed_Info DP [mandatory] and all other originating DPs that may be encountered after Origination_Attempt [optional] are proposed since not all SSP suppliers may retain this information for the duration of the connection. The Termination_Attempt_Authorized DP [mandatory] and all those terminating DPs that may be encountered other than Termination_Attempt_Authorized [optional] are proposed since not all SSP suppliers may retain this information for the duration of the connection.

6)   *Alternative ATM Traffic Descriptor/Alternative ATM Cell Rate* – An indicator of the potentially negotiated forward and backward cell rates and associated traffic parameters for the connection as defined in ITU-T Q.2962.1 and ITU-T Q.2725.1.

The alternative ATM traffic information is available at the Origination_Attempt DP and the Termination_Attempt DP. This criterion could be applicable at all originating and terminating DPs. Since ATM Traffic Descriptor information may not be analysed until the Analyse_Information PIC, this criterion could be applicable at the Analysed_Info DP and beyond. The Analysed_Info DP [mandatory] and all other originating DPs that may be encountered after Origination_Attempt [optional] are proposed since not all SSP suppliers may retain this information for the duration of the connection. The Termination_Attempt_Authorized DP [mandatory] and all those terminating DPs that may be encountered other than Termination_Attempt_Authorized [optional] are proposed since not all SSP suppliers may retain this information for the duration of the connection.

7)   *Minimum Acceptable ATM Traffic Descriptor/Minimum ATM Cell Rate* – An indicator of the potentially negotiated forward and backward cell rates and associated traffic parameters for the connection as defined in ITU-T Q.2962.1 and ITU-T Q.2725.1.

The minimum ATM traffic information is available at the Origination_Attempt DP and the Termination_Attempt DP. This criterion could be applicable at all originating and terminating DPs. Since ATM Traffic Descriptor information may not be analysed until the Analyse_Information PIC, this criterion could be applicable at the Analysed_Info DP and beyond. The Analysed_Info DP [mandatory] and all other originating DPs that may be encountered after Origination_Attempt [optional] are proposed since not all SSP suppliers may retain this information for the duration of the connection. The Termination_Attempt_Authorized DP [mandatory] and all those terminating DPs that may

be encountered after Termination_Attempt_Authorized [optional] are proposed since not all SSP suppliers may retain this information for the duration of the connection.

8) *Broadband Bearer capability* – An indicator of the bearer transfer capability as defined in ITU-T Q.2931 and ITU-T Q.2763, e.g. Deterministic Bit Rate (DBR), Statistical Bit Rate (SBR), Available Bit Rate (ABR), ATM Block Transfer (ABT). Contents of the Broadband Bearer Capability may be used to apply routing for the connection or to authorize other ATM connection parameters through ATM negotiation procedures.

The bearer capability information is available at the Origination_Attempt DP and the Termination_Attempt DP. This criterion could be applicable at all originating and terminating DPs. The Analysed_Info DP [mandatory] and all other originating DPs that may be encountered after Origination_Attempt [optional] are proposed since not all SSP suppliers may retain this information for the duration of the connection. The Termination_Attempt_Authorized DP [mandatory] and all those terminating DPs that may be encountered after Termination_Attempt_Authorized [optional] are proposed since not all SSP suppliers may retain this information for the duration of the connection.

9) *Addressing/Numbering Plan Identification (called party)* – An indicator of how the called party address is coded (e.g. E.164, NSAP, private).

The addressing/numbering plan identification is available at the Origination_Attempt DP and the Termination_Attempt DP. These criteria could be applicable at the Origination_Attempt DP and Termination_Attempt DP, and beyond. The Origination_Attempt DP [mandatory] and all those originating DPs that may be encountered after Origination_Attempt [optional] are proposed since not all SSP suppliers may retain this information for the duration of the connection. The Termination_Attempt DP [mandatory] and all those terminating DPs that may be encountered after Termination_Attempt [optional] are proposed since not all SSP suppliers may retain this information for the duration of the connection.

10) *Specific called party digit strings* – A string of digits that must match collected digit strings for numbering plans in which selected strings of digits have significance in routing of the connection, in selecting services provided to the subscriber, or in determining the administrative authority for the addressing plan. It could be zero or more digits.

The string of digits should be consistent with the structure of the addressing plan and should be administrable. For example, the network provider may specify the first N digits where N is consistent with the structure of the E.164 numbering plan, or any other appropriate numbering plan such as NSAP.

Collected digit strings can be available at the Origination_Attempt DP or the Termination_Attempt DP for a party served by either a B-ISDN DSS2 interface or a B-ISDN B-ISUP interface and could be applicable at all originating or terminating DPs. Since collected digit strings are not analysed until the Analyse_Information PIC (except to determine if a valid sequence has been provided), this criterion could be applicable at the Analysed_Info DP and beyond. The Analysed_Info DP [mandatory] and all those originating DPs that may be encountered after Analysed_Info [optional] are proposed since not all SSP suppliers may retain this information for the duration of the connection. The Termination_Attempt_Authorized DP [mandatory] and all those terminating DPs that may be encountered other than Termination_Attempt_Authorized [optional] are proposed since not all SSP suppliers may retain this information for the duration of the connection.

11) *Specific called party address* – An address that must match the complete called party address, which is unknown NSAP, international, national, network specific, subscriber or abbreviated, or a number in a customized numbering plan.

The called party address can be available at the Origination_Attempt DP for a party served by a B-ISDN interface using *en bloc* sending or for a SS No. 7 B-ISUP interface. Since collected address information may not be analysed until the Analyse_Information PIC (except to determine if sufficient information has been collected), this criterion could be applicable at the Analysed_Info DP and beyond, and at all terminating DPs. In the originating BCSM, the Analysed_Info DP [mandatory] and all those originating DPs that may be encountered after Analysed_Info [optional] are proposed. The Termination_Attempt_Authorized DP [mandatory] and all those terminating DPs that may be encountered other than Termination_Attempt_Authorized [optional] are proposed since not all SSP suppliers may retain this information for the duration of the connection.

12) *AESA for called party* – An indication that the AESA may be used for routing. Additionally, fields within the particular AESA may match fields that have significance in routing of the connection, in selecting services provided to the subscriber, or in determining the administrative authority for the addressing plan. The fields may be composed of one or more digits, or of binary fields, depending on the addressing plan.

The AESA for called party can be available at the Origination_Attempt DP for a party served by a SS No. 7 B-ISUP interface. Since collected address information may not be analysed until the Analyse_Information PIC (except to determine if sufficient information has been collected), these criteria could be applicable at the Analysed_Info DP and beyond, and at all terminating DPs. In the originating BCSM, the Analysed_Info DP [mandatory] and all those originating DPs that may be encountered after Analysed_Info [optional] are proposed. The Termination_Attempt_Authorized DP [mandatory] and all those terminating DPs that may be encountered other than Termination_Attempt_Authorized [optional] are proposed since not all SSP suppliers may retain this information for the duration of the connection.

13) *Called party subaddress* – An indicator of whether the subaddress is NSAP, user-specified ATM, or other user-specified, and the contents of the subaddress.

The called party subaddress can be available at the Origination_Attempt DP in the originating BCSM and the Termination_Attempt DP in the terminating BCSM for a call originating from a B-ISDN interface, and can be available at the Origination_Attempt DP and the Termination_Attempt DP for SS No. 7 B-ISUP interfaces. Since collected address information may not be analysed until the Analyse_Information PIC (except to determine if sufficient information has been collected), this criterion could be applicable at the Analysed_Info DP and beyond, and at all terminating DPs. In the originating BCSM, the Analysed_Info DP [mandatory] and all those originating DPs that may be encountered after Analysed_Info [optional] are proposed. The Termination_Attempt_Authorized DP [mandatory] and all those terminating DPs that may be encountered other than Termination_Attempt_Authorized [optional] are proposed since not all SSP suppliers may retain this information for the duration of the connection.

14) *Called party indicators* – An indicator of whether the called party is an ordinary subscriber or a payphone.

The called party indicators can be available at the Call_Accepted DP in the terminating BCSM and at the O_Term_Seized DP in the originating BCSM for a call terminating on a SS No. 7 B-ISUP interface. This criterion could be applicable at all subsequent DPs.

15) *Charge indicator* – An indicator of whether the call will receive a charge or not receive a charge.

The charge indicator can be available at the Call_Accepted DP in the terminating BCSM and at the O_Term_Seized DP in the originating BCSM for a call terminating on a SS No. 7 B-ISUP interface. This criterion could be applicable at all subsequent DPs.

16) *Addressing/Numbering Plan Identification (calling party)* – An indicator of how the called party address is coded (e.g. E.164, NSAP, private).

The addressing/numbering plan identification is available at the Origination_Attempt DP and the Termination_Attempt DP. This criterion could be applicable at the Origination_Attempt DP and Termination_Attempt DP, and beyond. The Origination_Attempt DP [mandatory] and all those originating DPs that may be encountered other than Origination_Attempt [optional] are proposed since not all SSP suppliers may retain this information for the duration of the connection. The Termination_Attempt_Authorized DP [mandatory] and all those terminating DPs that may be encountered other than Termination_Attempt_Authorized [optional] are proposed since not all SSP suppliers may retain this information for the duration of the connection.

17) *Specific calling party digit strings* – A string of digits that must match collected digit strings for numbering plans in which selected strings of digits have significance in routing of the connection, in selecting services provided to the subscriber, or in determining the administrative authority for the addressing plan. It could be zero or more digits.

The string of digits should be consistent with the structure of the addressing plan and should be administrable. For example, the network provider may specify the first N digits where N is consistent with the structure of the E.164 numbering plan, or any other appropriate numbering plan such as NSAP.

Collected digit strings can be available at the Origination_Attempt DP or the Termination_Attempt DP for a party served by either a B-ISDN DSS2 interface or a B-ISDN B-ISUP interface and could be applicable at all originating or terminating DPs. Since collected digit strings are not analysed until the Analyse_Information PIC (except to determine if a valid sequence has been provided), this criterion could be applicable at the Analysed_Info DP and beyond. The Analysed_Info DP [mandatory] and all those originating DPs that may be encountered other than Analysed_Info [optional] are proposed since not all SSP suppliers may retain this information for the duration of the connection.

18) *Specific calling party address* – An address that must match the complete calling party address, which is unknown NSAP, international, national, network specific, subscriber or abbreviated, or a number in a customized numbering plan.

The calling party number is available at the Origination_Attempt DP in the originating BCSM and the Termination_Attempt DP in the terminating BCSM for a call originating from a B-ISDN interface, and can be available at the Origination_Attempt DP and the Termination_Attempt DP for SS No. 7 B-ISUP interfaces. Since collected address information may not be analysed until the Analyse_Information PIC (except to determine if sufficient information has been collected), this criterion could be applicable at the Analysed_Info DP and beyond, and at all terminating DPs. In the originating BCSM, the Analysed_Info DP [mandatory] and all those originating DPs that may be encountered other than Analysed_Info [optional] are proposed.

19) *AESA for calling party* – Fields within the particular AESA may match fields that have significance in routing of the connection, in selecting services provided to the subscriber, or in determining the administrative authority for the addressing plan. The fields may be composed of one or more digits, or of binary fields, depending on the addressing plan.

The AESA for calling party is available at the Origination_Attempt DP in the originating BCSM and the Termination_Attempt DP in the terminating BCSM for a call originating from a SS No. 7 B-ISUP interface. Since collected address information may not be analysed until the Analyse_Information PIC (except to determine if sufficient information has been collected), this criterion could be applicable at the Analysed_Info DP and beyond, and at all terminating DPs. In the originating BCSM, the Analysed_Info DP [mandatory] and all those originating DPs that may be encountered other than Analysed_Info [optional] are proposed.

20) *Calling party subaddress* – An indicator of whether the subaddress is NSAP, user-specified ATM, or other user-specified, and the contents of the subaddress.

The calling party subaddress can be available at the Origination_Attempt DP in the originating BCSM and the Termination_Attempt DP in the terminating BCSM for a call originating from B-ISDN interfaces, and can be available at the Origination_Attempt DP and the Termination_Attempt DP for SS No. 7 B-ISUP interfaces. Since collected address information may not be analysed until the Analyse_Information PIC (except to determine if sufficient information has been collected), this criterion could be applicable at the Analysed_Info DP and beyond, and at all terminating DPs. In the originating BCSM, the Analysed_Info DP [mandatory] and all those originating DPs that may be encountered other than Analysed_Info [optional] are proposed.

21) *Calling party Category* – A parameter that indicates operator language, calling subscriber priority, data call, payphone. The calling party category is available at the Origination_Attempt DP in the originating BCSM and the Termination_Attempt DP in the terminating BCSM for a call originating from a SS No. 7 B-ISUP interface. This criterion could be applicable at all DPs.

22) *Feature codes or Escape Digits* (e.g.*XX, #) – A vertical service code, such as a "#" or a two-digit or three-digit code preceded by "" or ""11"" that precedes any subsequent digit collection (e.g. according to the ""normal addressing plan"").

Feature codes can be available at the Origination_Attempt DP for a party served by a B-ISDN interface using *en bloc* sending. Since collected digit strings are not analysed until the Analyse_Information PIC (except to determine if sufficient information has been collected), this criterion could be applicable at the Analysed_Info DP and beyond. The Analysed_Info DP [mandatory] and all those originating DPs that may be encountered after Analysed_Info [optional] are proposed since not all SSP suppliers may retain this information for the duration of the call/attempt.

23) *Prefixes* (e.g. 0+, 00+, 011, 01, 1+) – A string of digits that are not feature codes or access codes and which precede any subsequent digit collection (e.g. according to the ""normal numbering plan"").

Prefixes can be available at the Origination_Attempt DP for a party served by a B-ISDN interface using *en bloc* sending. Since collected prefix information is not analysed until the Analyse_Information PIC (except to determine if sufficient information has been collected), this criterion could be applicable at the Analysed_Info DP and beyond. The Analysed_Info DP [mandatory] and all those originating DPs that may be encountered after Analysed_Info [optional] are proposed since not all SSP suppliers may retain this information for the duration of the call/attempt.

24) *Access codes* (e.g. 8+) for customized numbering plan – A string of digits in a customized numbering plan that matches access codes such as attendant access codes, access codes to escape to the public network, access codes to access a private facility, access codes to access a private network, and feature access codes.

Access codes can be available at the Origination_Attempt DP for a party served by a B-ISDN interface using *en bloc* sending. Since collected access codes are not analysed until the Analyse_Information PIC (except to determine if sufficient information has been collected), this criterion could be applicable at the Analysed_Info DP and beyond. The Analysed_Info DP [mandatory] and all those originating DPs that may be encountered after Analysed_Info [optional] are proposed since not all SSP suppliers may retain this information for the duration of the call/attempt.

25) *Specific Connection Identifier* – An identifier of the specific Virtual Path Connection on a B-ISDN interface from which a specific connection attempt is to be originated or to which a specific connection attempt is to be terminated.

The connection identifier is used in two contexts. The first context, Origination_Attempt DP and Facility_Selected_and_Available DP, allows service logic to select the VPCI of the originating and terminating call portions. The second context, Analysed_Information DP, is used to authenticate that the VPCI requested by the subscriber is consistent with the service profile.

The Connection Identifier is available at the Origination_Attempt DP for a party served by either a B-ISDN DSS2 interface or a B-ISDN B-ISUP interface and could be applicable at all originating DPs. The Connection Identifier is also available during the Facility_Selected_and_Available DP after an appropriate terminating connection identifier has been selected for a party served by a B-ISDN DSS2 interface or by a B-ISDN B-ISUP interface and could be applicable at the Facility_Selected_and_Available, T_No_Answer, T_Answer, T_Mid_Call, T_Suspended, T_Re_Answer and T_Disconnect DPs and at the T_Abandon DP (only after a terminating connection identifier appropriate for the connection has been selected).

26) *End-to-End Transit Delay* – An indicator of the requested and accumulated transit delay as defined in ITU-T Q.2931.

The transit delay information is available at the Origination_Attempt DP and the Termination_Attempt DP. The accumulated transit delay may be updated before Authorize_Origination_Attempt and before Present_Call. The Analysed_Info DP [mandatory] and all originating DPs other than Analysed_Info [optional]. The Termination_Attempt_Authorized [mandatory] and all other terminating DPs [optional].

27) *Maximum End-to-End Transit Delay* – An indicator of the requested transit delay as defined in ITU-T Q.2763.

The transit delay information is available at the Origination_Attempt DP and the Termination_Attempt DP. The Analysed_Info DP [mandatory] and all originating DPs other than Analysed_Info [optional]. The Termination_Attempt_Authorized [mandatory] and all other terminating DPs [optional].

28) *Propagation Delay Counter* – An indicator of the accumulated transit delay as defined in ITU-T Q.2763.

The accumulated transit delay information is available at the Origination_Attempt DP and at the Termination_Attempt DP. The accumulated transit delay may be updated before Authorize_Origination_Attempt and before Present_Call. The Analysed_Info DP [mandatory] and all originating DPs other than Analysed_Info [optional]. The Termination_Attempt_Authorized [mandatory] and all other terminating DPs [optional].

29) *QoS Class* – This is a set of parameterized values that indicate the QoS classes allowed in the forward and backward directions of the connection across the DSS2 and B-ISUP interfaces.

The QoS parameter information element is present in B-ISDN DSS2 and in B-ISUP Q.2763. The codepoint indicates No specific QoS class explicitly requested, Class 1 (Stringent class), Class 2 (Tolerant class), and Class 3 (Bi-level class).

The QoS class is available at the Origination_Attempt DP and could be applicable at any of the originating DPs. QoS class is available at the Termination_Attempt DP and could be applicable at any of the terminating DPs. The Analysed_Info DP [mandatory] and all originating DPs other than Analysed_Info [optional]. The Termination_Attempt_Authorized [mandatory] for DSS2 and all other terminating DPs [optional].

30) *CDVT Descriptor* – This indicates the Cell Delay Variation Tolerance of the requested connection. The CDVT descriptor is present in B-ISDN DSS2 and in B-ISUP.

The CDVT descriptor is available at the Origination_Attempt DP and could be applicable at any of the originating DPs. The CDVT descriptor is available at the Termination_Attempt DP and could be applicable at any of the terminating DPs. The Analysed_Info DP [mandatory] and all originating DPs other than Analysed_Info [optional]. The Termination_Attempt_Authorized [mandatory] for DSS2 and all other terminating DPs [optional].

31) *Generic Identifier Transport* – The Generic Identifier Transport information element is used to carry identifiers for Digital Storage Media – Command and Control (DSM-CC), H.310, ATM Signalling VCC, Internet, Multiprotocol over ATM (MPOA) VPN, among others. It is present in B-ISDN DSS2 and in B-ISUP.

The Generic Identifier is available at the Origination_Attempt DP and could be applicable at any of the originating DPs. The Generic Identifier is available at the Termination_Attempt DP and could be applicable at any of the terminating DPs. Because information may not be analysed until the Analyse_Information PIC, this criterion could be applicable at the Analysed_Info DP and beyond. The Collected_Information DP [mandatory], Analysed_Info DP [mandatory] and all originating DPs that may be encountered other than Origination_Attempt [optional] are proposed since not all SSP suppliers may retain this information for the duration of the connection. The Termination_Attempt_Authorized [mandatory] and all terminating DPs that may be encountered other than Termination_Attempt_Authorized [optional] are proposed since not all SSP suppliers may retain this information for the duration of the connection. Note that terminating triggers may not be applicable to all service contexts. The reference is included only for those contexts that may use them.

32) *Transit Network Selection* – An indicator of the network routing as defined in ITU-T Q.2931 and ITU-T Q.2763.

The transit network information is available at the Origination_Attempt DP and the Termination_Attempt DP. The Analysed_Info DP [mandatory] and all originating DPs other than Analysed_Info [optional]. The Termination_Attempt_Authorized [mandatory] and all other terminating DPs [optional].

33) *Connection Modify Request* – A detection of a Q.2931 (Q.2963.1) or Q.2763 (Q.2725.2) connection modification request.

Modification procedure is allowed during the active phase, O_Active and T_Active, at the six exchange types and shall not be combined with narrow-band emulation service.

34) *Cause* (unconditional/conditional on specific cause patterns) – A match on the Cause IE contained in a signalling message as defined in DSS2 and B-ISUP or an indicator of the cause of specific events of interest. Further study is required to identify the cause values needed as DP criteria for IN Capability Set for B-ISDN services from the complete list of cause values.

Route selection failure information is available at the Route_Select_Failure DP, busy cause information is available at the O_Called_Party_Busy and T_Busy DPs, and release cause information is available at the O_Disconnect, O_Abandon, T_Disconnect and T_Abandon DPs. This criterion is applicable at the identified DPs.

DP criteria assignment to a TDP is dependent on the information available at that DP.

The following two tables (Table 3 and Table 4) denote applicability of DP criteria to all the DPs.

The entries in the table can be of one of the following trigger categories:

•       Individual-Based;

•       Group-Based;

•       Switch-Based.

**Notes relating to Tables 3 and 4**

NOTE 1 – Interpretation of Bearer Capability as optional for all DPs other than Origination_Attempt needs further clarification (e.g. Origination_Attempt DP mandatory means Termination_Attempt DP mandatory).

NOTE 2 – A trigger requiring analysis of a specific number of received digits. The analysis can be based on the complete number of received digits or can be based on a predefined number of digits starting from the most significant digit of the received information.

NOTE 3 – In a local switch only. The BCSM has to analyse (if facility is allowed, stored as Class of Service attribute) the received information and has to initiate an IN trigger if required. A feature activation/indication can be available at all DPs in the originating BCSM for a party served by a B-ISDN DSS2 interface. A feature activation/indication can be available at the T_No_Answer, T_Answer, T_Mid_Call, T_Suspend, T_Re_Answer, T_Disconnect and T_Abandon DPs in the terminating BCSM for a party served by a B-ISDN interface.

NOTE 4 – May be based on a match on contents of the Facility Information Element contained in a signalling message as defined for DSS2.

NOTE 5 – The Connection ID criteria is applicable to the Origination_Attempt DP if enabled to influence the selection of VPCI on the originating call portion. In this situation, a VPCI must be returned in the connect operation for insertion in the DSS2 SETUP Acknowledge or Call Proceeding messages, or the B-ISUP IAM Acknowledge message for the originating call portion.

Similarly, the Connection ID criteria is applicable at the Facility_Selected_and_Available DP, if enabled to influence the selection of VPCI on the terminating call portion.

The Connection ID criteria is applicable at the Analyse_Information DP to determine if the calling party has signalled a VPCI consistent with the service profile. If not, the connection would typically be released with cause.

Further, specific Connection Identifier selection by the user is outside the scope of this capability set. The network can override user selection of the Connection Identifier.

If a criteria is marked with an "X" for a Detection Point, then this means that the criteria specific information associated with the trigger criteria shall be kept available until the DP is reached. If a criteria is marked with an "O" for a Detection Point, then this means that it is implementation dependent if the criteria specific information is still present at that DP because not all suppliers may retain this information for the duration of the call/attempt. If the information is still present, the treatment is the same as for a criteria marked with an "X".

**Table 3/Q.1237 – Originating DP criteria for B-ISDN interfaces**

| DP Criteria | Originating DP | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ARF | OA | OAD | OAA | CI | AI | RSF | OTS | OCPB | ONA | oAns | OMC | OMR | OS | ORA | OD | oAb |
| Trigger Assigned | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| AAL Parameter | O | O | O | O | X | X | O | O | O | O | O | O | – | O | O | O | AAL |
| ATM Traffic Descriptor | O | O | O | O | O | X | O | O | O | O | O | O | O | O | O | O | ATM |
| ATM Cell Rate/Additional ATM Cell Rate | O | O | O | O | O | X | O | O | O | O | O | O | O | O | O | O | AT |
| Alternative ATM Traffic Descriptor | O | O | O | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| Minimum ATM Traffic Descriptor | O | O | O | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| Broadband Bearer Capability (Note 1) | O | O | O | O | O | X | O | O | O | O | O | O | – | O | O | O | Bro |
| Addressing Plan Called | O | O | O | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| Called Party Digits (Note 2) | O | O | O | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| Called Party Address | O | O | O | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| AESA for Called Party | O | O | O | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| Called Subaddress | O | O | O | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| Called Party Indicators | – | – | – | – | – | – | – | X | O | O | O | O | – | O | O | O | O |
| Charge Indicator | – | – | – | – | – | – | – | X | O | O | O | O | – | O | O | O | O |
| Address Plan Calling | – | O | O | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| Calling Party Digits (Note 2) | – | O | O | O | O | X | O | O | O | O | O | O | – | O | O | O | O |

**Table 3/Q.1237 – Originating DP criteria for B-ISDN interfaces** *(continued)*

| DP Criteria | Originating DP | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ARF | OA | OAD | OAA | CI | AI | RSF | OTS | OCPB | ONA | oAns | OMC | OMR | OS | ORA | OD | oAb |
| Calling Party Address | – | O | O | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| AESA Calling Party | – | O | O | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| Calling Subaddress | – | O | O | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| Calling Party Category | – | O | O | O | O | O | O | O | O | O | O | O | – | O | O | O | O |
| Feature Codes (Notes 2, 3 and 4) | X | – | – | – | – | X | O | O | O | O | O | O | – | O | O | O | O |
| Prefixes (Note 2) | O | – | – | – | – | X | O | O | O | O | O | O | – | O | O | O | O |
| Access Codes (Note 2) | O | – | – | – | – | X | O | O | O | O | O | O | – | O | O | O | O |
| Connection ID (Note 5) | O | X | O | X | X | X | O | O | O | O | O | O | – | O | O | O | O |
| Transit Delay | O | O | O | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| Propagation Delay | O | O | O | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| QoS Class | O | O | O | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| CDVT | O | O | O | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| Generic Identifier | O | O | O | O | X | X | O | O | O | O | O | O | – | O | O | O | O |
| Transit Network | O | O | O | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| Modify Request | – | – | – | – | – | – | – | – | – | – | – | – | X | – | – | – | – |
| Cause | – | – | – | – | – | – | X | – | X | – | – | – | – | – | – | X | X |
| X  Applicable | | | | | –  Not Applicable | | | | | | | | O  Optional | | | | |

**Table 3/Q.1237 – Originating DP criteria for B-ISDN interfaces** *(concluded)*

| | | | | |
|---|---|---|---|---|
| The DPs in the table are abbreviated as follows: | | | | |
| OA | Origination_Attempt | | ONA | O_No_Answer |
| OAA | Origination_Attempt_Authorized | | Oans | O_Answer |
| OAD | Origination_Attempt_Denied | | OMC | O_Mid_Call |
| CI | Collected_Info | | OMR | O_Modify_Request |
| AI | Analysed_Info | | OS | O_Suspend |
| ARF | Authorize_Route_Failure | | ORA | O_Re_Answer |
| RSF | Route_Select_Failure | | OD | O_Disconnect |
| OCPB | O_Called_Party_Busy | | OAb | O_Abandon |
| OTS | O_Term_Seized | | | |

## Table 4/Q.1237 – Terminating DP criteria for B-ISDN interfaces

| DP Criteria | Terminating DP | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TA | TAD | TAA | TB | FSA | CA | TNA | tAns | TMC | TMR | TS | TRA | TD | Tab |
| Trigger Assigned | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| AAL Parameter | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| ATM Traffic Descriptor | O | O | X | O | O | O | O | O | O | O | O | O | O | O |
| ATM Cell Rate/Additional ATM Cell Rate | O | O | X | O | O | O | O | O | O | O | O | O | O | O |
| Alternative ATM Traffic Descriptor | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| Minimum ATM Traffic Descriptor | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| Broadband Bearer Capability (Note 1) | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| Addressing Plan Called | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| Called Party Digits (Note 2) | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| Called Party Address | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| AESA for Called Party | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| Called Subaddress | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| Called Party Indicators | – | – | – | – | – | X | O | O | O | – | O | O | O | O |
| Charge Indicator | – | – | – | – | – | X | O | O | O | – | O | O | O | O |
| Address Plan Calling | X | X | O | O | O | O | O | O | O | – | O | O | O | O |
| Calling Party Digits (Note 2) | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| Calling Party Address | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| AESA for Calling Party | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| Calling Subaddress | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| Calling Party Category | X | X | O | O | O | O | O | O | O | – | O | O | O | O |

**Table 4/Q.1237 – Terminating DP criteria for B-ISDN interfaces** *(concluded)*

| DP Criteria | Terminating DP | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **TA** | **TAD** | **TAA** | **TB** | **FSA** | **CA** | **TNA** | **tAns** | **TMC** | **TMR** | **TS** | **TRA** | **TD** | **Tab** |
| Feature Codes (Notes 2, 3 and 4) | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| Prefixes (Note 2) | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| Access Codes (Note 2) | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| Connection ID (Note 5) | – | – | – | – | X | O | O | O | O | – | O | O | O | O |
| Transit Delay | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| Propagation Delay | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| QoS Class | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| CDVT | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| Generic Identifier | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| Transit Network | O | O | X | O | O | O | O | O | O | – | O | O | O | O |
| Modify Request | – | – | – | – | – | – | – | – | – | X | – | – | – | – |
| Cause | – | – | – | X | – | – | – | – | – | – | – | – | X | X |
| X  Applicable | | | | | –  Not Applicable | | | | | O  Optional | | | | |

The DPs in the table are abbreviated as follows:

| | | | |
|---|---|---|---|
| TA | Termination_Attempt | tAns | T_Answer |
| TAA | Termination_Attempt_Authorized | TMC | T_Mid_Call |
| TAD | Termination_Attempt_Denied | TMR | T_Modify_Request |
| CA | Terminating_Call_Accepted | TS | T_Suspend |
| TB | T_Busy | TRA | T_Re_Answer |
| FSA | Facility_Selected_and_Available | TD | T_Disconnect |
| TNA | T_No_Answer | Tab | T_Abandon |

### 6.3.8　Trigger types and trigger precedence for B-ISDN when carrying N-ISDN services

The descriptions of Trigger Types and Trigger Precedence in 6.3.8/Q.1238.2 apply. Following are comments regarding the implementation of N-ISDN services in a broadband environment.

Narrow-band ISDN services may be implemented over a B-ISDN network by carrying ISDN signalling information in the broadband protocols. As a result, triggers for narrow-band services as defined in ITU-T Q.1238 may be applicable.

Applicability of narrow-band triggers is contingent on the availability of appropriate narrow-band DSS1 or ISUP signalling information in the broadband protocol. It is also contingent on changes to the trigger descriptions to recognize the broadband bearer rather than the narrow-band bearer, e.g. Shared Interoffice Path or Channel for B-ISDN rather than Shared Interoffice Trunk in ISDN, and Connection Setup VPCI or VCI for B-ISDN rather than Channel Setup PRI in ISDN. A list of Triggers that may be available for narrow-band services is provided below as an example.

–　　Origination_Attempt_Authorized;

–　　Off-Hook_Delay;

–　　Connection_Setup_VPCI;

–　　Shared_Interoffice_Path;

–　　BRI_Feature_Activation_Indicator;

–　　Public_Feature_Code;

–　　Specific_Feature_Code;

–　　Customized_Dialling_Plan;

–　　Specific_Digit_String;

–　　Emergency Service;

–　　Call_Authorization_Denied;

–　　AFR;

–　　O_Called_Party_Busy;

–　　O_No_Answer;

–　　O_Answer;

–　　O_Disconnect;

–　　Termination_Attempt;

–　　Term_Attempt_Authorized;

–　　T_Busy;

–　　Term_Resource_Available;

–　　T_No_Answer;

–　　T_Answer;

–　　T_Disconnect.

### 6.3.9　Trigger types and trigger precedence for B-ISDN

The descriptions of Trigger Types and Trigger Precedence in 6.3.8/Q.1238.2 apply. The trigger types given are described in terms of:

1)　　TDP – The TDP at which the trigger can be detected.

2)　　DP Criteria – The conditions needed to trigger.

3)    Category – Switch, group or individual.

4)    Interface – Type of interface to which it can be assigned (e.g. DSS2 interface).

5)    Trigger Type – The value that identifies the type of criteria that cause the CCF/SSF to detect a valid trigger condition at this TDP (i.e. the trigger type).

6)    Fault handling – Defines fault handling procedures for the case when the SCF does not respond to the CCF/SSF message. Details on possibilities for fault handling is for further study.

The same DP may be armed multiple times as a TDP-R. To accommodate this, precedence rules for trigger processing are specified as follows:

1)    For DSS2 interfaces, a trigger assigned to the interface may depend on a query of the subscriber's Service Profile. The trigger at the DSS2 interface and the Service Profile may be provisioned with different SCFs as the destination. The sequence of processing shall be Service Profile first and DSS2 interface last.

2)    Individual triggers have precedence over group triggers.

3)    Group triggers have precedence over switch triggers.

The sequence for processing IN Capability Set for B-ISDN triggers is implementation dependent, within the precedence rules stated above. There is significant flexibility for using the triggers for IN Capability Set for B-ISDN and it is expected that not all triggers will be enabled in a network at any given time. Table 5 lists the triggers available for each TDP. Precedence rules for network operator defined trigger types are for further study.

**Table 5/Q.1237 – IN Capability Set for B-ISDN – Trigger availability**

| Trigger Detection Point | Trigger Type | Trigger Detection Point | Trigger Type |
|---|---|---|---|
| Collected_Information | AAL_Parameter | Termination_Attempt_Authorized | AAL_Parameter |
| | Shared_Interoffice_Path | | ATM_Traffic_Descriptor |
| | Generic_Identifier | | Alternative_Cell_rate |
| | Served_User_Transport | | CDVT_Descriptor |
| Analysed_Information | ATM_Traffic_Descriptor | | Broadband_Bearer_Capability |
| | Alternative_Cell_Rate | | Called_Party_Plan |
| | CDVT_Descriptor | | Called_Party_Digits |
| | Broadband_Bearer_Capability | | Called_Party_Address |
| | Feature_Code | | AESA_Called_Party |
| | Specific_Feature_Code | | Called_Party_Subaddress |
| | Called_Party_Plan | | Connection_Setup_VPCI |
| | Called_Party_Digits | | Transit_Delay |
| | Called_Party_Address | | QoS_Parameter |
| | AESA_Called_Party | | Generic_Identifier |
| | Called_Party_Subaddress | | TNS_Parameter |
| | Calling_Party_Plan | | Served_User_Transport |

**Table 5/Q.1237 – IN Capability Set for B-ISDN – Trigger availability** *(concluded)*

| Trigger Detection Point | Trigger Type | Trigger Detection Point | Trigger Type |
|---|---|---|---|
| | Calling_Party_Digits | T_Call_Accepted | Called_Party's_Indicator |
| | Calling_Party_Address | | Charge_Indicator |
| | AESA_Calling_Party | | |
| | Calling_Party_Subaddress | | |
| | Connection_Setup_VPCI | | |
| | Transit_Delay | | |
| | QoS_Parameter | | |
| | TNS_Parameter | | |
| | Emergency Service | | |
| O_Term_Seized | Called_Party's_Indicators | | |
| | Charge_Indicator | | |

### 6.3.9.1    Setup_Immediate

The CCF/SSF detects the Setup_Immediate trigger when an origination indication from the interface is detected. The Origination_Attempt TDP has been reached.

1)      TDP: Origination_Attempt.

2)      DP Criteria: Trigger assigned (unconditional).

3)      Category: Individual, Group.

4)      Trigger assigned to: Originating Address, Group of Addresses, Switch Interface, virtual User-Network Interface (UNI).

5)      Trigger Type: setUpImmediate.

6)      Fault Handling: Final treatment (other treatment such as Default Routing or Continue Call Processing are for further study).

### 6.3.9.2    Origination_Attempt_Authorized

Refer to ITU-T Q.1238.2.

### 6.3.9.3    AAL_Parameter

The AAL_Parameter trigger type denotes the detection of a request for the services of a particular ATM Adaptation Layer (AAL). It is used when there is a desire to deliver ATM connections of specific AAL types over selected paths (VPCIs), as well as to validate the availability of the requested AAL to the subscriber.

1)      TDP: Collected_Information, Termination_Attempt_Authorized.

2)      DP criteria: Trigger assigned (conditional). AAL Type.

3)      Category: Individual, Group, Switch.

4)      Trigger assigned to: Address (originating, terminating), Group of Addresses, Switch Interface, virtual UNI, all addresses or interfaces assigned on the switch.

5) Trigger Type: aalParameter.

6) Fault handling: Final Treatment (other treatments such as Default Routing or Continue Call Processing are for further study).

### 6.3.9.4 Shared_Interoffice_Path

The Shared_Interoffice_Path trigger type denotes a class of events in which a CCF/SSF performs trigger processing for a CCF. It is detected for connections routed to a CCF/SSF from a CCF: an assist procedure is to be invoked. The CCF/SSF supports a shared interoffice path trigger for the interface to a CCF. On this interface, SS No. 7 B-ISUP signalling, used by the CCF to route the call, is used by the CCF/SSF for triggering a query to the SCF. For example, this trigger may be used in providing a feature to supply specific routing of a call when an assist has been invoked.

1) TDP: Collected_Information.

2) DP criteria: Trigger assigned (unconditional).

3) Category: Group (on path basis).

4) Trigger assigned to: Specific VPCI.

5) Trigger Type: sharedIOPath.

6) Fault handling: Final Treatment (other treatments such as Default Routing or Continue Call Processing are for further study).

### 6.3.9.5 ATM_Traffic_Descriptor, ATM_Cell_Rate, Additional_Cell_Rate

The ATM_Traffic_Descriptor trigger type denotes the detection of a request for a particular ATM Cell Rate. It is used to select network paths (VPCI/VCIs) appropriate for the connection, and to ascertain the availability of the requested traffic descriptor to the subscriber.

1) TDP: Analysed_Information, Termination_Attempt_Authorized.

2) DP criteria: Trigger assigned (conditional). Subscribed Service Profile and Access Parameters.

3) Category: Individual, Group.

4) Trigger assigned to: Address (originating, terminating), Group of Addresses, Switch Interface, virtual UNI.

5) Trigger Type: aTMTrafficDescriptor.

6) Fault handling: Connection Negotiation, or Final Treatment.

### 6.3.9.6 Alternative_Cell_Rate, Minimum_Cell_Rate

The Alternative_Cell_Rate trigger type denotes the detection of a request for alternative ATM Cell Rates for the connection. This trigger is used to validate the requested ATM Traffic Parameters with those subscribed for the connection during the negotiation process.

1) TDP: Analysed_Information, Termination_Attempt_Authorized.

2) DP criteria: Trigger assigned (conditional). Subscribed Service Profile and Access Parameters.

3) Category: Individual, Group.

4) Trigger assigned to: Address (originating, terminating), Group of Addresses, Switch Interface, virtual UNI.

5) Trigger Type: alternativeCellRate.

6) Fault handling: Final Treatment.

### 6.3.9.7    CDVT_Descriptor

The CDVT Descriptor trigger type denotes a connection attempt with a request for a limit on Cell Delay Variation. It is detected when CCF/SSF receives a SETUP message on a DSS2 interface or an Initial Address Message (IAM) on a B-ISUP interface. This trigger is used to select the preferred path (VPCI) for a connection when the available transmission paths have varying CDV capability. It may subsequently provide information for ATM Parameter Negotiation procedures over the selected VPCI.

1)    TDP: Analysed_Information, Termination_Attempt_Authorized.

2)    DP criteria: Trigger assigned (conditional), Subscribed Service Profile and Access Parameters.

3)    Category: Individual, Group, Switch.

4)    Trigger assigned to: Address (originating, terminating), Group of Addresses, Switch Interface, Virtual UNI, all addresses or interfaces assigned on the switch.

5)    Trigger Type: cDVTDescriptor.

6)    Fault handling: Final Treatment.

### 6.3.9.8    Broadband_Bearer_Capability

The Broadband_Bearer_Capability trigger type denotes the detection of a request for specific bearer capabilities. It is used when there is a desire to deliver ATM connections of specific bearer capabilities over selected paths (VPCIs), as well as to validate the availability of the requested bearer capability to the subscriber.

1)    TDP: Analysed_Information, Termination_Attempt_Authorized.

2)    DP criteria: Trigger assigned (conditional). Subscribed Service Profile and Access Parameters.

3)    Category: Individual, Group, Switch.

4)    Trigger assigned to: Address (originating, terminating), Group of Addresses, Switch Interface, virtual UNI, all addresses and interfaces assigned on the switch.

5)    Trigger Type: broadbandBearerCapability.

6)    Fault handling: Final Treatment.

### 6.3.9.9    Feature_Code

The Feature_Code trigger type is detected when any of the CCF/SSF supported feature codes (e.g. *XX) are included in the called party address. Although several feature codes may cause the trigger to be detected, the CCF/SSF shall not differentiate between them for subscription purposes (e.g. *46, *53, *58 all cause the trigger to be detected). For example, this trigger may be used within a service provider's network to advertise other capabilities to the user when an existing feature code is used.

1)    TDP: Analysed_Information.

2)    DP criteria: Trigger assigned (conditional), Feature Code (unconditional).

3)    Category: Individual, Group, Switch.

4)    Trigger assigned to: Originating Address, Group of Addresses, Switch Interface, Virtual UNI, all addresses and interfaces assigned on the switch.

5)      Trigger Type: verticalServiceCode.

6)      Fault handling: Final Treatment (other treatments such as Default Routing or Continue Call Processing are for further study).

### 6.3.9.10   Specific_Feature_Code

The Specific_Feature_Code trigger type is detected when the CCF/SSF analyses a specific feature code which is administered as a DP criterion (e.g. only *46 causes the trigger to be detected). Restriction of Calling Number Delivery can be supported by this trigger type.

1)      TDP: Analysed_Information.

2)      DP criteria: Trigger assigned (conditional), feature code on specific feature pattern.

3)      Category: Individual, Group, Switch.

4)      Trigger assigned to: Originating Address, Group of Addresses, Switch Interface, Virtual UNI, all addresses or interfaces assigned on the switch.

5)      Trigger Type: specificFeatureCode.

6)      Fault handling: Final Treatment (other treatments such as Default Routing or Continue Call Processing are for further study).

### 6.3.9.11   Called_Party_Plan

The Called_Party_Plan trigger type is detected when the numbering plan information in the address is analysed. This can be used to query databases for routing between administrative domains that use different addressing authorities. Results of this query may be used to populate the Called Party Address (routing address), Called Party Subaddress, Transit Network Selection, as well as the ATM Cell Rate and Connection Identifier.

1)      TDP: Analysed_Information, Termination_Attempt_Authorized.

2)      DP criteria: Trigger assigned (conditional), Called Party Addressing Plan.

3)      Category: Individual, Group, Switch.

4)      Trigger assigned to: Originating Address, Group of Addresses, Switch Interface, Virtual UNI, all addresses or interfaces assigned on the switch.

5)      Trigger Type: calledPartyPlan.

6)      Fault handling: Final Treatment (other treatments such as Default Routing or Continue Call Processing are for further study).

### 6.3.9.12   Called_Party_Digits

The Called_Party_Digits trigger type is detected when the appropriate sequence of digits is included in the called party address. For example, a 3, 6, or 10-digit sequence of digits can be provisioned as the trigger. Trigger provisioning specifies whether the CCF/SSF performs some manipulation of the dialled digits (e.g. digit insertion, deletion, or translation to other addresses), or queries the SCF with the digits as presented in the SETUP message. The numbering plan in force should ensure that emergency service numbers are distinct from provisionable specific digit strings. Precedence should be specified (e.g. most to least specific). For example, this trigger could be used to provide for customized connection routing on a specific address. Results of this query may be used to populate the Called Party Address (routing address), Called Party Subaddress, Transit Network Selection, as well as the ATM Cell Rate and Connection Identifier.

1)      TDP: Analysed_Information, Termination_Attempt_Authorized.

2)      DP criteria: Trigger assigned (conditional), Specific called party number string.

3)       Category: Individual, Group, Switch.

4)       Trigger assigned to: Originating Address, Group of Addresses, Switch Interface, Virtual UNI, all addresses or interfaces assigned on the switch.

5)       Trigger Type: calledPartyDigits.

6)       Fault handling: Final Treatment (other treatments such as Default Routing or Continue Call Processing are for further study).

### 6.3.9.13   Called_Party_Address

The Called_Party_Address trigger type is detected when the appropriate called party address is included in the DSS2 SETUP or the B-ISUP IAM. For example, this trigger could be used to provide for customized connection routing on a specific address. Results of this query may be used to populate the Called Party Address (routing address), Called Party Subaddress, Transit Network Selection, as well as the ATM Cell Rate and Connection Identifier.

1)       TDP: Analysed_Information, Termination_Attempt_Authorized.

2)       DP criteria: Trigger assigned (conditional), Specific called party number string.

3)       Category: Individual, Group, Switch.

4)       Trigger assigned to: Originating Address, Group of Addresses, Switch Interface, Virtual UNI, all addresses or interfaces assigned on the switch.

5)       Trigger Type: calledPartyAddress.

6)       Fault handling: Final Treatment (other treatments such as Default Routing or Continue Call Processing are for further study).

### 6.3.9.14   AESA_Called_Party

The AESA_Called_Party trigger type is detected when the called party AESA is included in the DSS2 SETUP Called Party Address or the B-ISUP IAM AESA for Called Party. For example, this trigger could be used to provide for customized connection routing on a specific address. Results of this query may be used to populate the Called Party Address (routing address), Called Party Subaddress, Transit Network Selection, as well as the ATM Cell Rate and Connection Identifier.

1)       TDP: Analysed_Information, Termination_Attempt_Authorized.

2)       DP criteria: Trigger assigned (conditional), Called party AESA content.

3)       Category: Individual, Group, Switch.

4)       Trigger assigned to: Originating Address, Group of Addresses, Switch Interface, Virtual UNI, all addresses or interfaces assigned on the switch.

5)       Trigger Type: aESACalledParty.

6)       Fault handling: Final Treatment (other treatments such as Default Routing or Continue Call Processing are for further study).

### 6.3.9.15   Called_Party_Subaddress

The Called_Party_Subaddress trigger type is detected when the appropriate called party subaddress is included in the DSS2 SETUP or the B-ISUP IAM. For example, this trigger could be used to provide for customized connection routing on a specific address. Results of this query may be used to populate the Called Party Address (routing address), Called Party Subaddress, Transit Network Selection, as well as the ATM Cell Rate and Connection Identifier.

1)       TDP: Analysed_Information, Termination_Attempt_Authorized.

2)       DP criteria: Trigger assigned (conditional), Specific called party number string.

3)      Category: Individual, Group, Switch.

4)      Trigger assigned to: Originating Address, Group of Addresses, Switch Interface, Virtual UNI, all addresses or interfaces assigned on the switch.

5)      Trigger Type: calledPartyAddress.

6)      Fault handling: Final Treatment (other treatments such as Default Routing or Continue Call Processing are for further study).

### 6.3.9.16  Called_Party's_Indicator

The Called_Party's_Indicator trigger type is detected when the specific called party indicator information is included in the B-ISUP Address Complete or Progress message. For example, this trigger could be used to provide special treatment to connections terminating on specific terminal equipment as specified in the Called Party's Indicators.

1)      TDP: O_Term_Seized, T_Call_Accepted.

2)      DP criteria: Trigger assigned (conditional), Specific called party's indicators.

3)      Category: Individual, Group, Switch.

4)      Trigger assigned to: Originating Address, Group of Addresses, Switch Interface, Virtual UNI, all addresses or interfaces assigned on the switch.

5)      Trigger Type: calledPartysIndicator.

6)      Fault handling: Final Treatment (other treatments such as Default Routing or Continue Call Processing are for further study).

### 6.3.9.17  Charge_Indicator

The Charge_Indicator trigger type is detected when the charge indicator information is included in the B-ISUP Address Complete or Progress message. For example, this trigger could be used to provide special treatment to connections indicating that a charge will apply.

1)      TDP: O_Term_Seized, T_Call_Accepted.

2)      DP criteria: Trigger assigned (conditional), Specific charge indicator.

3)      Category: Individual, Group, Switch.

4)      Trigger assigned to: Originating Address, Group of Addresses, Switch Interface, Virtual UNI, all addresses or interfaces assigned on the switch.

5)      Trigger Type: chargeIndicator.

6)      Fault handling: Final Treatment (other treatments such as Default Routing or Continue Call Processing are for further study).

### 6.3.9.18  Calling_Party_Plan

The Calling_Party_Plan trigger type is detected when the numbering plan information in the address is analysed. This can be used to query databases for routing between administrative domains that use different addressing authorities. Results of this query may be used to populate the Called Party Address (routing address), Called Party Subaddress, Calling Party Address, Calling Party Subaddress, Transit Network Selection, as well as the ATM Cell Rate and Connection Identifier.

1)      TDP: Analysed_Information, Termination_Attempt_Authorized.

2)      DP criteria: Trigger assigned (conditional), Called Party Addressing Plan.

3)      Category: Individual, Group, Switch.

4) Trigger assigned to: Originating Address, Group of Addresses, Switch Interface, Virtual UNI, all addresses or interfaces assigned on the switch.

5) Trigger Type: callingPartyPlan.

6) Fault handling: Final Treatment (other treatments such as Default Routing or Continue Call Processing are for further study).

### 6.3.9.19 Calling_Party_Digits

The Calling_Party_Digits trigger type is detected when the appropriate sequence of digits is included in the called party address. For example, a 3, 6, or 10-digit sequence of digits can be provisioned as the trigger and the CCF/SSF queries the SCF with the digits as presented in the SETUP message. The numbering plan in force should ensure that emergency service numbers are distinct from provisionable specific digit strings. Precedence should be specified (e.g. most to least specific): for further study. For example, this trigger could be used to provide for customized connection routing on a specific address. Results of this query may be used to populate the Called Party Address (routing address), Called Party Subaddress, Transit Network Selection, as well as the ATM Cell Rate and Connection Identifier.

1) TDP: Analysed_Information.

2) DP criteria: Trigger assigned (conditional), Specific called party number string.

3) Category: Individual, Group, Switch.

4) Trigger assigned to: Originating Address, Group of Addresses, Switch Interface, Virtual UNI, all addresses or interfaces assigned on the switch.

5) Trigger Type: callingPartyDigits.

6) Fault handling: Final Treatment (other treatments such as Default Routing or Continue Call Processing are for further study).

### 6.3.9.20 Calling_Party_Address

The Calling_Party_Address trigger type is detected when the appropriate calling party address is included in the DSS2 SETUP or the B-ISUP IAM. For example, this trigger could be used to provide for customized connection routing on a specific address. Results of this query may be used to populate the Called Party Address (routing address), Called Party Subaddress, Calling Party Address, Calling Party Subaddress, Transit Network Selection, as well as the ATM Cell Rate and Connection Identifier.

1) TDP: Analysed_Information.

2) DP criteria: Trigger assigned (conditional), Specific called party number string.

3) Category: Individual, Group, Switch.

4) Trigger assigned to: Originating Address, Group of Addresses, Switch Interface, Virtual UNI, all addresses or interfaces assigned on the switch.

5) Trigger Type: callingPartyAddress.

6) Fault handling: Final Treatment (other treatments such as Default Routing or Continue Call Processing are for further study).

### 6.3.9.21 AESA_Calling_Party

The AESA_Calling_Party trigger type is detected when the calling party AESA is included in the DSS2 SETUP Calling Party Address or the B-ISUP IAM AESA for Calling Party. For example, this trigger could be used to provide for customized connection routing on a specific address. Results of this query may be used to populate the Called Party Address (routing address), Called

Party Subaddress, Calling Party Address, Calling Party Subaddress, Transit Network Selection, as well as the ATM Cell Rate and Connection Identifier.

1) TDP: Analysed_Information.

2) DP criteria: Trigger assigned (conditional), Calling party AESA content.

3) Category: Individual, Group, Switch.

4) Trigger assigned to: Originating Address, Group of Addresses, Switch Interface, Virtual UNI, all addresses or interfaces assigned on the switch.

5) Trigger Type: aESACallingParty.

6) Fault handling: Final Treatment (other treatments such as Default Routing or Continue Call Processing are for further study).

### 6.3.9.22 Calling_Party_Subaddress

The Calling_Party_Subaddress trigger type is detected when the appropriate calling party subaddress is included in the DSS2 SETUP or the B-ISUP IAM. For example, this trigger could be used to provide for customized connection routing on a specific address. Results of this query may be used to populate the Called Party Address (routing address), Called Party Subaddress, Calling Party Address, Transit Network Selection, as well as the ATM Cell Rate and Connection Identifier.

1) TDP: Analysed_Information.

2) DP criteria: Trigger assigned (conditional), Specific called party number string.

3) Category: Individual, Group, Switch.

4) Trigger assigned to: Originating Address, Group of Addresses, Switch Interface, Virtual UNI, all addresses or interfaces assigned on the switch.

5) Trigger Type: callingPartySubaddress.

6) Fault handling: Final Treatment (other treatments such as Default Routing or Continue Call Processing are for further study).

### 6.3.9.23 Connection_Setup_VPCI

The Connection_Setup_VPCI trigger type denotes a connection attempt on a specific Virtual Path Connection Identifier (VPCI), or Virtual Channel Identifier (VCI). It is detected when CCF/SSF receives a SETUP message on a DSS2 interface, or an Initial Address Message (IAM) on a B-ISUP interface. This trigger occurs for all connections that use the identified VPCI or VPCI/VCI in a SETUP or IAM. For example, if a VPCI is dedicated to a specific service, this trigger could be used in providing this service on that VPCI. It may subsequently provide information for ATM Parameter Negotiation procedures over the selected VPCI.

1) TDP: Origination_Attempt, Facility_Selected_and_Available.

2) DP criteria: Trigger assigned (conditional), Specific Virtual Path Connection identifier.

3) Category: Individual, Group, Switch.

4) Trigger assigned to: Address (originating, terminating), Group of Addresses, Switch Interface, Virtual UNI, all addresses or interfaces assigned on the switch.

5) Trigger Type: connectionSetupVPCI.

6) Fault handling: Final Treatment.

### 6.3.9.24    Transit_Delay

The Transit_Delay trigger type denotes a connection attempt with a specified Maximum Allowable End-to-End Transit Delay. It is detected when CCF/SSF receives a SETUP message on a DSS2 interface or an Initial Address Message (IAM) on a B-ISUP interface. This trigger is used to select the preferred path (VPCI) for a connection when the transmission layer has multiple latency capability. It may subsequently provide information for ATM Parameter Negotiation procedures over the selected VPCI and may be used to update the Propagation Delay value based on the attributes of the originating or terminating access network.

1)      TDP: Analysed_Information, Termination_Attempt_Authorized.

2)      DP criteria: Trigger assigned (conditional), Subscribed Service Profile and Access Parameters.

3)      Category: Individual, Group, Switch.

4)      Trigger assigned to: Address (originating, terminating), Group of Addresses, Switch Interface, Virtual UNI, all addresses or interfaces assigned on the switch.

5)      Trigger Type: transitDelay.

6)      Fault handling: Final Treatment.

### 6.3.9.25    QoS_Parameter

The QoS_Parameter trigger type denotes a connection attempt with a request for a particular QoS class. It is detected when CCF/SSF receives a SETUP message on a DSS2 interface or an Initial Address Message (IAM) on a B-ISUP interface. This trigger is used to select the preferred path (VPCI) for a connection when the transmission path has multiple QoS capability. It may subsequently provide information for ATM Parameter Negotiation procedures over the selected VPCI.

1)      TDP: Analysed_Information, Termination_Attempt_Authorized.

2)      DP criteria: Trigger assigned (conditional), Subscribed Service Profile and Access Parameters.

3)      Category: Individual, Group, Switch.

4)      Trigger assigned to: Address (originating, terminating), Group of Addresses, Switch Interface, Virtual UNI, all addresses or interfaces assigned on the switch.

5)      Trigger Type: qoSParameter.

6)      Fault handling: Final Treatment.

### 6.3.9.26    Generic identifier

The Generic Identifier trigger type denotes a connection attempt with a request for a specific service context to be provided by a network service node. It is detected when CCF/SSF receives a SETUP message on a DSS2 interface or an Initial Address Message (IAM) on a B-ISUP interface. This trigger may be used to connect the originating party to a network service node with the requested service context. Note that the Generic Identifier may exist in signalling for a non-subscribed originating party. In such case, it will be ignored.

1)      TDP: Collected_Information, Analysed_Information, Termination_Attempt_Authorized.

2)      DP criteria: Trigger assigned (conditional), Subscribed Service Profile, or specific served user reference.

3)      Category: Individual, Group, Switch.

4) Trigger assigned to: Address (originating, terminating), Group of Addresses, Switch Interface, Virtual UNI, all addresses or interfaces assigned on the switch.

5) Trigger Type: genericIdentifier.

6) Fault handling: Final Treatment (other treatments such as continue call processing may also apply based on network specific arrangements).

### 6.3.9.27 TNS_Parameter

The TNS_Parameter trigger type denotes a connection attempt with a request for particular TNS parameters. It is detected when CCF/SSF receives a SETUP message on a DSS2 interface or an Initial Address Message (IAM) on a B-ISUP interface. This trigger is used to select the preferred path (VPCI) for a connection. It may also be used to populate addressing information into the appropriate addressing fields based on network provider agreements. It may subsequently provide information for ATM Parameter Negotiation procedures over the selected VPCI.

1) TDP: Analysed_Information, Termination_Attempt_Authorized.

2) DP criteria: Trigger assigned (conditional), Subscribed Service Profile and Access Parameters.

3) Category: Switch.

4) Trigger assigned to: All addresses or interfaces assigned on the switch.

5) Trigger Type: tNSParameter.

6) Fault handling: Final Treatment.

### 6.3.9.28 Emergency service

The Emergency_Service trigger type is detected when a digit string denoting emergency service is dialled. The CCF/SSF detects the Emergency Service trigger on any call with access to the public office numbering plan when a designated Emergency Service (e.g. 911) number is dialled. This trigger can provide for emergency call handling under control of the SCF.

1) TDP: Analysed_Information.

2) DP criteria: Trigger assigned (conditional), Specific called party number string.

3) Category: Switch.

4) Trigger assigned to: All addresses or interfaces assigned on the switch.

5) Trigger Type: emergencyService.

6) Fault handling: Final Treatment (other treatments such as Default Routing or Continue Call Processing are for further study).

### 6.3.9.29 O_Term_Seized

Refer to ITU-T Q.1238.2.

### 6.3.9.30 O_Called_Party_Busy

Refer to ITU-T Q.1238.2.

### 6.3.9.31 O_No_Answer

Refer to ITU-T Q.1238.2.

### 6.3.9.32 O_Answer

Refer to ITU-T Q.1238.2.

### 6.3.9.33   O_Disconnect

Refer to ITU-T Q.1238.2.

### 6.3.9.34   O_Modify_Request

The CCF/SSF detects the oModify trigger when a DSS2 or B-ISUP Modify Request message is sent by the connection originator. The originating subscriber database is queried to verify that the requested parameters are authorized for the subscriber and the originating access network.

1)      TDP: O_Modify_Request.

2)      DP Criteria: Trigger assigned (unconditional).

3)      Category: Individual, Group.

4)      Trigger assigned to: Individual – Origination Address, Group – DSS2 interface, or switch interface.

5)      Trigger Type: oModifyRequest.

6)      Fault Handling: Modify_Result-modifyReject and resume call in active state.

### 6.3.9.35   Termination_Attempt

Refer to ITU-T Q.1238.2.

### 6.3.9.36   Term_Attempt_Authorized

Refer to ITU-T Q.1238.2.

### 6.3.9.37   T_Busy

Refer to ITU-T Q.1238.2.

### 6.3.9.38   Facility_Selected_And_Available

Refer to ITU-T Q.1238.2.

### 6.3.9.39   Call_Accepted

Refer to ITU-T Q.1238.2.

### 6.3.9.40   T_No_Answer

Refer to ITU-T Q.1238.2.

### 6.3.9.41   T_Answer

Refer to ITU-T Q.1238.2.

### 6.3.9.42   T_Disconnect

Refer to ITU-T Q.1238.2.

### 6.3.9.43   T_Modify_Request

The CCF/SSF detects the tModify trigger when a DSS2 or B-ISUP Modify Request message is sent by the connection originator. The terminating subscriber database is queried to verify that the requested parameters are authorized for the subscriber and the terminating access network.

1)      TDP: T_Modify_Request.

2)      DP Criteria: Trigger assigned (unconditional).

3)      Category: Individual, Group.

4)       Trigger assigned to: Individual – Destination Address, Group – DSS2 interface, or switch
         interface.

5)       Trigger Type: tModifyRequest.

6)       Fault Handling: Modify_Result-modifyReject and resume call in active state.

## 6.4     Feature interaction manager (FIM)/Call manager (CM)

The descriptions of FIM and CM in 6.4/Q.1238.2 apply.

### 6.4.1   DP handling

The Detection Point handling rules of ITU-T Q.1238 apply, however, the implicit disarming rules
are expanded for the B-ISDN modify capability.

#### 6.4.1.1   Implicit EDP disarming rules

Implicit EDP disarming rules are specified in ITU-T Q.1238 for Originating BCSM and
respectively Terminating BCSM. The following tables include extensions to ITU-T Q.1238. Only
EDPs that are impacted by broadband are included in the tables, for simplicity.

**Table 6/Q.1237 – O_BCSM: Implicit EDP disarming table**

| EDP Disarmed | O Modify Request C-Leg | O Modify Request P-Leg | O Modify Result C-Leg | O Modify Result P-Leg |
|---|---|---|---|---|
| EDP Encountered | | | | |
| O_Disconnect Controlling Leg | X | | X | |
| O_Disconnect Passive Leg | | X | | X |
| O_Modify_Request | X | X | | |
| O_Modify_Result | | | X | X |
| X  Represents IN CS-3 SSF Implicit Disarming of EDP. | | | | |

**Table 7/Q.1237 – T_BCSM: Implicit EDP disarming table**

| EDP Disarmed | T Modify Request C-Leg | T Modify Request P-Leg | T Modify Result C-Leg | T Modify Result P-Leg |
|---|---|---|---|---|
| EDP Encountered | | | | |
| T_Disconnect Controlling Leg | X | | X | |
| T_Disconnect Passive Leg | | X | | X |
| T_Modify_Request | X | X | | |
| T_Modify_Result | | | X | X |
| X  Represents IN CS-3 SSF Implicit Disarming of EDP. | | | | |

## 6.5 IN-Switching manager (IN-SM)

The descriptions of IN-Switching Manager in 6.5/Q.1238.2 apply.

### 6.5.1 The connection view model

The Connection View Model of ITU-T Q.1238 applies to ITU-T Q.1237. The treatment for added broadband DPs to accommodate bearer modification is included in this clause.

#### 6.5.1.1 CSCV transitions on DP notification

Modify is permitted during the Active phase of a connection. It applies to stable states of the CSCV: Stable 1 Party, Stable 2 Party, and Stable Multi-Party. Modify also applies to other states of the CSCV that occur when the call is in the Active phase: 1_Party, Forward, Transfer, On-Hold. The detection of the Modify DPs will not transition the CSCV to a new state.

**Table 8/Q.1237 – Transitions of DPs and signalling events to the CSCV states**

| Transition to CSCV State ➔<br><br>Detection of DP⬇ | Originating _Setup | Originating _1_Party _Setup | Stable_1 _Party | Terminating _Setup | 1_Party | Stable_2 _Party | Forward | Transfer | On_Hold | Stable_Multi _Party |
|---|---|---|---|---|---|---|---|---|---|---|
| O_Modify_Request DP **for leg c and leg p** | Not applicable | Not applicable | Stable_1 _Party | Not applicable | 1_Party (if_Active) Not applicable (Otherwise) | Stable_2 _Party | Forward (if_Active) Not applicable (Otherwise) | Transfer (if_Active) Not applicable (Otherwise) | On_Hold (if_Active) Not applicable (Otherwise) | Stable MultiParty |
| O_Modify_Result DP **for leg c and leg p** | Not applicable | Not applicable | Stable_1 _Party | Not applicable | 1_Party (if_Active) Not applicable (Otherwise) | Stable_2 _Party | Forward (if_Active) Not applicable (Otherwise) | Transfer (if_Active) Not applicable (Otherwise) | On_Hold (if_Active) Not applicable (Otherwise) | Stable MultiParty |
| T_Modify_Request DP **for leg c and leg p** | Not applicable | Not applicable | Stable_1 _Party | Not applicable | 1_Party (if_Active) Not applicable (Otherwise) | Stable_2 _Party | Forward (if_Active) Not applicable (Otherwise) | Transfer (if_Active) Not applicable (Otherwise) | On_Hold (if_Active) Not applicable (Otherwise) | Stable_Multi _Party |
| T_Modify_Result DP **for leg c and leg p** | Not applicable | Not applicable | Stable_1 _Party | Not applicable | 1_Party (if_Active) Not applicable (Otherwise) | Stable_2 _Party | Forward (if_Active) Not applicable (Otherwise) | Transfer (if_Active) Not applicable (Otherwise) | On_Hold (if_Active) Not applicable (Otherwise) | Stable MultiParty |

# 7 SCF model

The descriptions of the SCF model in clause 7/Q.1238.2 apply.

# 8 Finite state model for SSF

The descriptions of the Finite state model for the SSF in clause 8/Q.1238.2 apply.

# 9 Finite state model for SCF

The descriptions of the Finite state model for the SCF in clause 9/Q.1238.2 apply.

# 10 Finite state model for USI

The descriptions of the Finite state model for User Service Information in clause 10/Q.1238.2 apply.

# 11 Operation procedures

The following operations are modified for B-ISDN service contexts. They are included here to provide additional description. Operations described in ITU-T Q.1238 that are not listed here are not changed and may apply to the B-ISDN service contexts. The operations are numbered consistently with their sequence in ITU-T Q.1238.2.

In case of discrepancies between the Call Segment Connection View (CSCV) state transition tables and diagrams described in ITU-T Q.1238 and the state transition tables provided in the following detailed operation procedure descriptions, the former tables take precedence.

NOTE – A detailed description of each of the parameters associated with the operation procedure descriptions can be found in clause 12.

## 11.1 Connect procedure

### 11.1.1 General description

The description, procedures, and parameters in ITU-T Q.1238 apply, subject to the availability of parameters in B-ISDN signalling. The following parameters are added for B-ISDN.

#### 11.1.1.1 Parameters

– aALParameters;
– additionalATMCellRate(aTMTrafficDescriptor);
– aESACalledParty;
– aESACallingParty;
– alternativeATMTrafficDescriptor (alternativeATMCellRate);
– aTMCellRate(aTMTrafficDescriptor);
– calledPartySubaddress;
– cDVTDescriptor;
– connectionIdentifier;
– cumulativeTransitDelay(propagationDelayCounter);
– endToEndTransitDelay(maximumEndtoEndTransitDelay);

–       genericIdentifier;

–       minimumAcceptableATMTrafficDescriptor(minimumATMCellRate);

–       qoSParameter.

## 11.2     ContinueWithArgument procedure

### 11.2.1   General description

The description, procedures, and parameters in ITU-T Q.1238 apply, subject to the availability of parameters in B-ISDN signalling. The following parameters are added for B-ISDN.

#### 11.2.1.1   Parameters

–       connectionIdentifier.

## 11.3     EventReportBCSM procedure

### 11.3.1   General description

The description, procedures, and parameters in ITU-T Q.1238 apply.

## 11.4     InitialDP procedure

### 11.4.1   General description

The description, procedures, and parameters in ITU-T Q.1238 apply, subject to the availability of parameters in B-ISDN signalling. The following parameters are added for B-ISDN.

#### 11.4.1.1   Parameters

–       aALParameters;

–       additionalATMCellRate(aTMTrafficDescriptor);

–       aESACalledParty;

–       aESACallingParty;

–       alternativeATMTrafficDescriptor (alternativeATMCellRate);

–       aTMCellRate(aTMTrafficDescriptor);

–       calledPartySubaddress;

–       cDVTDescriptor;

–       connectionIdentifier;

–       cumulativeTransitDelay(propagationDelayCounter);

–       endToEndTransitDelay(maximumEndtoEndTransitDelay);

–       genericIdentifier;

–       minimumAcceptableATMTrafficDescriptor(minimumATMCellRate);

–       qoSParameter.

## 11.5     InitiateCallAttempt procedure

### 11.5.1   General description

The description, procedures, and parameters in ITU-T Q.1238 apply, subject to the availability of parameters in B-ISDN signalling. The following parameters are added for B-ISDN.

### 11.5.1.1 Parameters

- aALParameters;
- additionalATMCellRate(aTMTrafficDescriptor);
- aESACalledParty;
- aESACallingPArty;
- alternativeATMTrafficDescriptor (alternativeATMCellRate);
- aTMCellRate(aTMTrafficDescriptor);
- calledPartySubaddress;
- bearerCapability;
- cDVTDescriptor;
- connectionIdentifier;
- cumulativeTransitDelay(propagationDelayCounter);
- endtoEndTransitDelay(maximumEndtoEndTransitDelay);
- genericIdentifier;
- minimumAcceptableATMTrafficDescriptor(minimumATMCellRate);
- qoSParameter.

## 11.6    RequestReportBCSMEvent procedure

### 11.6.1    General description

The description, procedures, and parameters in ITU-T Q.1238 apply, subject to the availability of parameters in B-ISDN signalling. The following DPs are added to the arming tables for the B-ISDN modify capability. See Tables 9 and 10.

**Table 9/Q.1237 – DP arming table for O-BCSM**

| O_BCSM | Controlling leg | Passive leg | Default leg ID |
|---|---|---|---|
| O_Modify_Request DP | X | X | – o2) |
| O_Modify_Result DP | X | X | – o2) |
| o2)    The "legID" parameter shall be included. | | | |
| X    Arming Applicable<br>–    Not Applicable | | | |

**Table 10/Q.1237 – DP arming table for T-BCSM**

| T_BCSM | Controlling leg | Passive leg | Default leg ID |
|---|---|---|---|
| T_Modify_Request DP | X | X | _ t2) |
| T_Modify_Result DP | X | X | _ t2) |
| t2)    The "legID " parameter shall be included. | | | |
| X    Arming Applicable<br>–    Not Applicable | | | |

## 12 Parameter descriptions

The descriptions of ITU-T Q.1238.2 apply with the following added definitions for the additional parameters included in operations for B-ISDN.

### 12.1 AALParameters

This parameter specifies the ATM adaptation layer parameters information element which provides a means to convey information related to the ATM adaptation layer between endpoints. The information is of significance to both users and local exchanges. The ATM adaptation layer parameters information element is transferred transparently between ATM endpoints by the network. Refer to ITU-T Q.2931.

### 12.2 AdditionalATMCellRate

This parameter indicates information sent in the forward and backward direction to support the use of additional traffic parameters to the application process procedures. Refer to ITU-T Q.2762 for the actual definition of this parameter.

### 12.3 AESACalledParty

This parameter indicates information sent in the forward direction to carry the AESA received in the UNI Called party number IE across public network(s). Refer to ITU-T Q.2762 for the actual definition of this parameter.

### 12.4 AESACallingParty

This parameter indicates information sent in the forward direction to carry the AESA received in the UNI Calling party number IE across public network(s). Refer to ITU-T Q.2762 for the actual definition of this parameter.

### 12.5 AlternativeATMCellRate

This parameter indicates the Alternative ATM Cell Rate or the Alternative ATM traffic descriptor information element. It is used to negotiate alternative traffic parameters during call/connection setup. Refer to ITU-T Q.2763 for the actual definition of Alternative ATM Cell Rate and ITU-T Q.2931 for the actual definition of Alternative ATM traffic descriptor.

### 12.6 ATMCellRate

This parameter indicates information classified by the cell rate identifier indicating the number of cells per second that are required for the call. The cell rate value is unchanged as it traverses the B-ISDN network. Refer to ITU-T Q.2762 for the actual definition of this parameter.

### 12.7 BearerCapability

This parameter indicates the type of bearer capability connection or transmission medium requirements to the user. It is a network option to select one of the two parameters to be used:

–    bearerCap:

This parameter contains the value of the DSS1 Bearer Capability parameter (ITU-T Q.931) in case the SSF is at local exchange level or the value of the ISUP User Service Information parameter (ITU-T Q.763) in case the SSF is at transit exchange level.

The parameter "bearerCapability" shall only be included in the "InitialDP" operation in case the DSS1 Bearer Capability parameter or the ISUP User Service Information parameter is available at the SSP.

If two values for bearer capability are available at the SSF, or if User Service Information and User Service Information Prime are available at the SSF, the "bearerCap" shall contain the value of the preferred bearer capability, respectively the value of the User Service Information Prime parameter.

–     tmr:

The tmr is encoded as the Transmission Medium Requirement parameter of the ISUP according to ITU-T Q.763.

If two values for transmission medium requirement are available at the SSF or if Transmission Medium Requirement and Transmission Medium Requirement Prime are available at the SSF, the "bearerCap" shall contain the value of the preferred transmission medium requirement, respectively the value of the Transmission Medium Requirement Prime parameter.

–     BroadbandBearerCapability:

This alternative subparameter indicates a requested broadband connection-oriented bearer service (see ITU-T F.811) to be provided by the network. It explicitly identifies the ATM transfer capability. It contains only information that may be used by the network. Refer to ITU-T Q.2931 for the definition of this parameter.

## 12.8     CalledPartySubaddress

This parameter is used to identify a subaddress associated with the termination of a call, identifying the called party (e.g. specific CPE beyond the S/T reference point). Refer to ITU-T Q.931 (or ITU-T Q.2931) for the actual definition of this parameter.

## 12.9     CDVTDescriptor

This parameter indicates information sent in the forward and backward direction to determine the upper bound of the tolerance admitted for the time interval between cells pertaining to a given cell flow. The calling user may request CDVT values applicable for the forward direction and the maximum acceptable CDVT value for the backward direction. The received CDVT values are handled by the network and conveyed to the called user. The network(s) may use the signalled CDVT values for policing and decisions regarding resource allocation and shaping. The backward CDVT values shall be interpreted as maximum acceptable values for the cell flow in the backward direction. Refer to ITU-T Q.2931 for the actual definition of this parameter.

## 12.10     ConnectionIdentifier

This parameter indicates information sent to identify the ATM virtual connection. It includes the virtual path connection identifier and the virtual channel identifier. Refer to ITU-T Q.2931 for the actual definition of this parameter.

## 12.11     CumulativeTransitDelay

This parameter indicates the cumulative transit delay to be expected for a virtual channel connection. The support of the cumulative transit delay information element is mandatory for the network and optional for the user. Refer to ITU-T Q.2931 for the actual definition of this parameter.

## 12.12     EndtoEndTransitDelay

This parameter indicates the End-to-end transit delay information element which indicates the maximum end-to-end transit delay acceptable for a connection. The support of the End-to-end transit delay information element is mandatory for the network and optional for the user. Refer to ITU-T Q.2931 for the actual definition of this parameter.

## 12.13   EventSpecificInformationBCSM

This parameter indicates the call related information specific to the event. It comprises the alternatives listed in ITU-T Q.1238.2, as well as the alternative listed here.

> .
> .
> .

or

−   oModifyRequestSpecificInfo

- aTMCellRate
- additionalATMCellRate

or

−   oModifyResultSpecificInfo

- modifyResultType
- aTMCellRate
- additionalATMCellRate

or

−   tModifyRequestSpecificInfo

- aTMCellRate
- additionalATMCellRate

or

−   tModifyResultSpecificInfo

- modifyResultType
- aTMCellRate
- additionalATMCellRate

## 12.14   GenericIdentifier

This parameter indicates the DSS2 generic identifier transport capability. This capability allows the transport through the B-ISDN of identifiers required and used by various distributed applications. This signalling capability is a means of end-to-end signalling using identifiers having a specific purpose which the network can optionally access but not change. In some cases the network may create an identifier on behalf of the user or at its request. Refer to ITU-T Q.2931 for the actual definition of this parameter.

## 12.15   MinimumATMCellRate

This parameter indicates the Minimum acceptable ATM Cell Rate or Minimum acceptable ATM traffic descriptor. It is used to negotiate traffic parameters during call/connection setup. The minimum acceptable ATM Cell Rate parameters are the lowest values that the user is willing to accept for the call/connection. Refer to ITU-T Q.2763 for the actual definition of Minimum ATM Cell Rate and to ITU-T Q.2931 for the actual definition of Minimum ATM Traffic Descriptor.

## 12.16   QoSParameter

This parameter enables the optional signalling of individual Quality of Service (QoS) parameters while establishing a new ATM connection (VP or VC). The calling user can optionally signal individual QoS parameters in addition to the mandatory signalling of the QoS. Refer to ITU-T Q.2931 for the actual definition of this parameter.

# 13 Errors

The descriptions of errors and procedures in clause 13/Q.1238.2 apply.

# 14 ASN.1 definitions

The ASN.1 definitions of ITU-T Q.1238 are applicable subject to the availability of services and features in signalling. Definitions for added B-ISDN capabilities and services are provided in the following clauses.

## 14.1 Data types

**AALParameters {B2 : b2} ::= OCTET STRING (SIZE(b2.&minAALPLength..b2.&maxAALPLength))**
-- *Indicates the AAL Parameters Information Element. Refer to Q.2931 for encoding.*
**AdditionalATMCellRate {B2 : b2} ::= OCTET STRING (SIZE(b2.&minAdditionalATMCellRateLength..b2.& maxAdditionalATMCellRateLength))**
-- *Indicates the AdditionalATMCellRate Information Element. Refer to Q.2763 for encoding.*
**AESACalledParty {B2 : b2} ::= OCTET STRING (SIZE(b2.&minAESACalledPartyLength..b2.&maxAESACalledPartyLength))**
-- *Indicates the AESACalledParty Information Element. Refer to Q.2763 for encoding.*
**AESACallingParty {B2 : b2} ::= OCTET STRING (SIZE(b2.&minAESACallingPartyLength..b2.&maxAESACallingPartyLength))**
-- *Indicates the AESACallingParty Information Element. Refer to Q.2763 for encoding.*
**AlternativeATMTrafficDescriptor {B2 : b2} ::= OCTET STRING (SIZE(b2.&minAlternativeATMTrafficDescriptorLength..b2.&maxAlternativeATMTrafficDescriptorLength))**
-- *Indicates the AlternativeATMTrafficDescriptor Information Element. Refer to Q.2931 for encoding.*
**ATMCellRate {B2 : b2} ::= OCTET STRING (SIZE(b2.&minATMCellRateLength..b2.&maxATMCellRateLength))**
-- *Indicates the ATMCellRate Information Element. Refer to Q.2763 for encoding.*
**BearerCapability {B2 : b2} ::= CHOICE {**
                                 **bearerCap**                     **[0] OCTET STRING**
                                       **(SIZE(2..b2.&maxBearerCapabilityLength)),**
                                   **tmr**                           **[1] OCTET STRING (SIZE(1)),**
                                   **broadbandBearerCap**   **[2] OCTET STRING**
                                   **(SIZE**       **(b2.&minBroadbandBearerCapabilityLength..**
                                        **b2.&maxBroadbandBearerCapabilityLength))**
                          **}**
-- *Indicates the type of bearer capability connection to the user. For narrow-band bearerCapability, either*
-- *DSS1 (Q.931) or the ISUP User Service Information (Q.763) encoding can be used. Refer*
-- *to the Q.763 Transmission Medium Requirement parameter for tmr encoding.*
-- *For broadband ISDN: Indicates the Broadband Bearer Capability. Refer to Q.2961 for encoding.*

**CalledPartySubaddress {B2 : b2} ::= OCTET STRING (SIZE(b2.&minCalledPartySubaddressLength..b2.& maxCalledPartySubaddressLength))**
-- *Indicates the CalledPartySubaddress Information Element. Refer to Q.2763 for encoding.*
**CDVTDescriptor {B2 : b2} ::= OCTET STRING (SIZE(b2.&minCDVTDescriptorLength..b2.& maxCDVTDescriptorLength))**
-- *Indicates the CDVTDescriptor Information Element. Refer to Q.2763 for encoding.*
**ConnectionIdentifier {B2 : b2} ::= OCTET STRING (SIZE(b2.&minConnectionIdentifierLength..b2.&maxConnectionIdentifierLength))**
-- *Indicates the ConnectionElementIdentifier Information Element. Refer to Q.2763 for encoding.*
**CumulativeTransitDelay {B2 : b2} ::= OCTET STRING (SIZE(b2.&minCumulativeTransitDelayLength..b2.& maxCumulativeTransitDelayLength))**
-- *Indicates the CumulativeTransitDelay Information Element. Refer to Q.2763 for encoding.*
**EndToEndTransitDelay {B2 : b2} ::= OCTET STRING (SIZE(b2.&minEndToEndTDLength..b2.&maxEndToEndTDLength))**
-- *Indicates the MaximumEndToEndTransitDelay Information Element. Refer to Q.2763 for encoding.*
**GenericIdentifier {B2 : b2} ::= OCTET STRING (SIZE(b2.&minGenericIdentifierLength..b2.& maxGenericIdentifierLength))**
-- *Indicates the GenericIdentifier Information Element. Refer to Q.2931 for encoding.*

**MinAcceptableATMTrafficDescriptor {B2 : b2} ::= OCTET STRING**
**(SIZE(b2.&minMinAcceptableATMTrafficDescriptorLength..b2.&maxMinAcceptableATMTrafficDescriptor**
**Length))**
*-- Indicates the MinimumAcceptableATMTrafficDescriptor Information Element. Refer to Q.2931 for encoding.*
**QoSParameter {B2 : b2} ::= OCTET STRING**
**(SIZE(b2.&minQoSParameterLength..b2.&maxQoSParameterLength))**
*-- Indicates the QoS. Refer to Q.2961 for encoding.*
**EventSpecificInformationBCSM {B2 : b2} ::= CHOICE {**

        .
        .
        .

    **oModifyRequestSpecificInfo**    **[40] SEQUENCE {**
       **aTMCellRate**              **[0] ATMCellRate {b2} OPTIONAL,**
       **additionalATMCellRate**      **[1] AdditionalATMCellRate {b2} OPTIONAL,**
       **...**
       **},**
    **oModifyResultSpecificInfo**     **[41] SEQUENCE {**
       **modifyResultType**         **[0] ModifyResultType DEFAULT**
                               **modifyAcknowledge,**
       **aTMCellRate**               **[1] ATMCellRate {b2} OPTIONAL,**
       **additionalATMCellRate**      **[2] AdditionalATMCellRate {b2} OPTIONAL,**
       **...**
       **},**
    **tModifyRequestSpecificInfo**    **[42] SEQUENCE {**
       **aTMCellRate**               **[0] ATMCellRate {b2} OPTIONAL,**
       **additionalATMCellRate**      **[1] AdditionalATMCellRate {b2} OPTIONAL,**
       **...**
       **},**
    **tModifyResultSpecificInfo**     **[43] SEQUENCE {**
       **modifyResultType**         **[0] ModifyResultType DEFAULT**
                               **modifyAcknowledge,**
       **aTMCellRate**               **[1] ATMCellRate {b2} OPTIONAL,**
       **additionalATMCellRate**      **[2] AdditionalATMCellRate {b2} OPTIONAL,**
       **...**
       **}**
    **}**

**ModifyResultType ::= ENUMERATED {**
    **modifyAcknowledge(0),**
    **modifyReject(1)**
    **}**

**EventTypeBCSM ::= ENUMERATED {**
    .
    .
    .
    **oModifyRequest(100),**
    **oModifyResult(101),**
    **tModifyRequest(102),**
    **tModifyResult(103)**
    **}**

**TriggerType ::= ENUMERATED {**
    .
    .
    .
    **oModifyRequest(100),**
    **tModifyRequest(101)**
    **}**

## 14.2    Classes

SCF-SSF-BOUNDS ::= CLASS {
                    .
                    .
                    .

| | | |
|---|---|---|
| &minAALPLength | INTEGER | OPTIONAL, |
| &maxAALPLength | INTEGER | OPTIONAL, |
| &minAdditionalATMCellRateLength | INTEGER | OPTIONAL, |
| &maxAdditionalATMCellRateLength | INTEGER | OPTIONAL, |
| &minAESACalledPartyLength | INTEGER | OPTIONAL, |
| &maxAESACalledPartyLength | INTEGER | OPTIONAL, |
| &minAESACallingPartyLength | INTEGER | OPTIONAL, |
| &maxAESACallingPartyLength | INTEGER | OPTIONAL, |
| &minATMCellRateLength | INTEGER | OPTIONAL, |
| &maxATMCellRateLength | INTEGER | OPTIONAL, |
| &minCalledPartySubaddressLength | INTEGER | OPTIONAL, |
| &maxCalledPartySubaddressLength | INTEGER | OPTIONAL, |
| &minCDVTDescriptorLength | INTEGER | OPTIONAL, |
| &maxCDVTDescriptorLength | INTEGER | OPTIONAL, |
| &minConnectionIdentifierLength | INTEGER | OPTIONAL, |
| &maxConnectionIdentifierLength | INTEGER | OPTIONAL, |
| &minCumulativeTransitDelayLength | INTEGER | OPTIONAL, |
| &maxCumulativeTransitDelayLength | INTEGER | OPTIONAL, |
| &minEndToEndTDLength | INTEGER | OPTIONAL, |
| &maxEndToEndTDLength | INTEGER | OPTIONAL, |
| &minGenericIdentifierLength | INTEGER | OPTIONAL, |
| &maxGenericIdentifierLength | INTEGER | OPTIONAL, |
| &minMinAcceptableATMTrafficDescriptorLength | INTEGER | OPTIONAL, |
| &maxMinAcceptableATMTrafficDescriptorLength | INTEGER | OPTIONAL, |
| &minQoSParameterLength | INTEGER | OPTIONAL, |
| &maxQoSParameterLength | INTEGER | OPTIONAL, |
| | | |
| &maxBearerCapabilityLength | INTEGER | OPTIONAL |
| &minBroadbandBearerCapabilityLength | INTEGER | OPTIONAL, |
| &maxBroadbandBearerCapabilityLength | INTEGER | OPTIONAL, |

                    }
WITH SYNTAX
                    {
            .
            .
            .

[MINIMUM-FOR-AAL-PARAMETERS                        &minAALPLength]
[MAXIMUM-FOR-AAL-PARAMETERS                        &maxAALPLength]
[MINIMUM-FOR-ADDITIONAL-ATM-CELL-RATE              &minAdditionalATMCellRateLength]
[MAXIMUM-FOR-ADDITIONAL-ATM-CELL-RATE              &maxAdditionalATMCellRateLength]
[MINIMUM-FOR-AESA-CALLED-PARTY                     &minAESACalledPartyLength]
[MAXIMUM-FOR-AESA-CALLED-PARTY                     &maxAESACalledPartyLength]
[MINIMUM-FOR-AESA-CALLING-PARTY                    &minAESACallingPartyLength]
[MAXIMUM-FOR-AESA-CALLING-PARTY                    &maxAESACallingPartyLength]
[MINIMUM-FOR-ATM-CELL-RATE                         &minATMCellRateLength]
[MAXIMUM-FOR-ATM-CELL-RATE                         &maxATMCellRateLength]
[MINIMUM-FOR-CALLED-PARTY-SUBADDRESS               &minCalledPartySubaddressLength]
[MAXIMUM-FOR-CALLED-PARTY-SUBADDRESS               &maxCalledPartySubaddressLength]
[MINIMUM-FOR-CDVT-DESCRIPTOR                       &minCDVTDescriptorLength]
[MAXIMUM-FOR-CDVT-DESCRIPTOR                       &maxCDVTDescriptorLength]
[MINIMUM-FOR-CONNECTION-IDENTIFIER                 &minConnectionIdentifierLength]
[MAXIMUM-FOR-CONNECTION-IDENTIFIER                 &maxConnectionIdentifierLength]
[MINIMUM-FOR-CUMULATIVE-TRANSIT-DELAY              &minCumulativeTransitDelayLength]
[MAXIMUM-FOR-CUMULATIVE-TRANSIT-DELAY              &maxCumulativeTransitDelayLength]
[MINIMUM-FOR-END-TO-END-TRANSIT-DELAY              &minEndToEndTDLength]
[MAXIMUM-FOR-END-TO-END-TRANSIT-DELAY              &maxEndToEndTDLength]

[MINIMUM-FOR-GENERIC-IDENTIFIER                    &minGenericIdentifierLength]
[MAXIMUM-FOR-GENERIC-IDENTIFIER                    &maxGenericIdentifierLength]
[MINIMUM-FOR-MIN-ACCEPTABLE-ATM-TRAFFIC-DESCRIPTOR
                    &minMinAcceptableATMTrafficDescriptorLength]
[MAXIMUM-FOR-MIN-ACCEPTABLE-ATM-TRAFFIC-DESCRIPTOR
                    &maxMinAcceptableATMTrafficDescriptorLength]
[MINIMUM-FOR-QOS-PARAMETER                    &minQoSParameterLength]
[MAXIMUM-FOR-QOS-PARAMETER                    &maxQoSParameterLength]

[MAXIMUM-FOR-BEARER-CAPABILITY                    &maxBearerCapabilityLength]
[MINIMUM-FOR-BROADBAND-BEARER-CAPABILITY          &minBroadbandBearerCapabilityLength]
[MAXIMUM-FOR-BROADBAND-BEARER-CAPABILITY          &maxBroadbandBearerCapabilityLength]
                    }


## 14.3    Operations and arguments

ConnectArg {B1 : b1, B2 : b2} ::= SEQUENCE {
                    .
                    .
                    .
                    calledPartySubaddress    [60] CalledPartySubaddress {b2}    OPTIONAL,
                    connectionIdentifier     [61] ConnectionIdentifier {b2}     OPTIONAL,
                    genericIdentifier        [62] GenericIdentifier {b2}        OPTIONAL,
                    qOSParameter             [63] QOSParameter {b2}             OPTIONAL,
                    bISDNParameters          [64] BISDNParameters               OPTIONAL,
                    ...
                    }


ContinueWithArgumentArg {B1 : b1, B2 : b2} ::= SEQUENCE {
                    .
                    .
                    .
                    connectionIdentifier     [60] ConnectionIdentifier {b2}     OPTIONAL,
                    …
                    }


InitialDPArg {B1 : b1, B2 : b2} ::= SEQUENCE {
                    .
                    .
                    .
                    calledPartySubaddress    [60] CalledPartySubaddress {b2}    OPTIONAL,
                    connectionIdentifier     [61] ConnectionIdentifier {b2}     OPTIONAL,
                    genericIdentifier        [62] GenericIdentifier {b2}        OPTIONAL,
                    qOSParameter             [63] QOSParameter {b2}             OPTIONAL,
                    bISDNParameters          [64] BISDNParameters               OPTIONAL,
                    ...
                    }


InitiateCallAttemptArg {B1 : b1, B2 : b2} ::= SEQUENCE {
                    .
                    .
                    .
                    bearerCapability         [60] BearerCapability {b2}         OPTIONAL,
                    calledPartySubaddress    [61] CalledPartySubaddress {b2}    OPTIONAL,
                    connectionIdentifier     [62] ConnectionIdentifier {b2}     OPTIONAL,
                    genericIdentifier        [63] GenericIdentifier {b2}        OPTIONAL,
                    qOSParameter             [64] QOSParameter {b2}             OPTIONAL,
                    bISDNParameters          [65] BISDNParameters               OPTIONAL,
                    ...
                    }

```
BISDNParameters {B2:b2} ::= SEQUENCE {
        aALParameters                   [0] AALParameters {b2}                          OPTIONAL,
        additionalATMCellRate           [1] AdditionalATMCellRate {b2}                  OPTIONAL,
        aESACalledParty                 [2] AESACalledParty {b2}                        OPTIONAL,
        aESACallingParty                [3] AESACallingParty {b2}                       OPTIONAL,
        alternativeATMTrafficDescriptor [4] AlternativeATMTrafficDescriptor {b2}        OPTIONAL,
        aTMCellRate                     [5] ATMCellRate {b2}                            OPTIONAL,
        cDVTDescriptor                  [6] CDVTDescriptor {b2}                         OPTIONAL,
        cumulativeTransitDelay          [7] CumulativeTransitDelay {b2}                 OPTIONAL,
        endToEndTransitDelay            [8] EndToEndTransitDelay {b2}                   OPTIONAL,
        minAcceptableATMTrafficDescriptor [9] MinAcceptableATMTrafficDescriptor {b2}   OPTIONAL,
        ...
        }
```

# APPENDIX I

## Mapping of Setup Request Primitive signalling information to PIC

This appendix provides examples of signalling information that may be available at the Points in Call (PICs) for the originating and terminating BCSM. It includes references to signalling Recommendations that are relevant at the time of writing.

### I.1    O_BCSM mapping of setup request primitive signalling information to PIC

### I.1.1    O_Null PIC

After detecting the Origination Attempt event, it is assumed that the CCF/SSF has information received from the signalling interface arrangement (e.g. as a Setup service request primitive is received due to a DSS2 Setup, B-ISUP IAM) available, associated with the originating call portion, with restrictions as noted.

ITU-T Q.2931 supports interworking between N-ISDN and B-ISDN. As a result, several information elements in support of 64 kbit/s based ISDN circuit mode services are carried through DSS2 B-ISDN. The CCF/SSF receives a SETUP message from a DSS2 interface and this SETUP message can contain the following information:

–    Bearer Capability – See Q.2931 Narrow-band Bearer Capability information element.

–    Progress Indicator – See Q.2931 Progress Indicator information element.

–    Keypad Facility – See Q.2932 Facility information element and Q.932 Keypad Facility. This information may be available at the CCF/SSF if ITU-T Q.2932 is supported on the interface.

–    Feature activation – See Q.2932 Facility information and Q.932 Feature Activation information element. This information may be available at the CCF/SSF if ITU-T Q.2932 is supported on the interface.

–    Calling party number – See Q.2931 Calling Party Number information element.

–    Called party number – See Q.2931 Called Party Number information element.

     The called party number information element is sent when *en bloc* sending is used. When the type of number and numbering plan identification field within the called party number information element is set to "unknown", the CCF/SSF treats the string as if it has been received within a keypad information element that is defined in ITU-T Q.932. In this case, it is not expected to be sent with the transit network selection or Operator Services Information elements.

–    Calling party subaddress and called party subaddress – See Q.2931 Calling Party Subaddress and Called Party Subaddress information elements.

- Carrier Access Code/Carrier Identification Code – See ITU-T Q.1290. The caller may dial a Carrier Access Code (CAC) (e.g. 101XXXX for use on this call). When the caller is served by a B-ISDN interface, a Carrier Identification Code, i.e. XXXX, may be received by the CCF/SSF within the transit network selection information element of the B-ISDN SETUP message.

- Transit Network Selection – See Q.2931 Transit Network Selection information element. This information element is included in a SETUP message containing other information elements than the Keypad information that is defined in ITU-T Q.932.

- Additional Calling Party Number – See Q.2931 Calling Party Number element.

- Feature Code – See Q.1290 Feature Code. Available, if used, for a party served by a DSS2 interface using *en bloc* sending or for an SS No. 7 B-ISUP interface.

- Access Code – See ITU-T Q.1290. Available, if used, for a party served by a DSS2 interface using *en bloc* sending.

- Service Profile Identifier (SPID) – See Q.2932 FACILITY message and Facility information element and Annex A/Q.932. This information may be available at the CCF/SSF if ITU-T Q.2932 is supported on the interface.

- Facility Information – See Q.2932 Facility information and Q.932 Facility Information element. This information may be available at the CCF/SSF if ITU-T Q.2932 is supported on the interface. This element may identify USI Information or Facility Information.

- Other information, as defined by Q.932 Generic Procedures for the Control of ISDN Supplementary Services, can be included in the Q.2931 NOTIFY message and in the Notification Indicator contained in other Q.2931 messages or the Q.2932 FACILITY message and the Facility information element. Some of this information may be of interest to the SCF.

ITU-T Q.2931 supports the services of B-ISDN. As a result, information elements in support of B-ISDN services are carried through DSS2. The CCF/SSF receives a SETUP message from a DSS2 interface and this SETUP message can contain the following information:

- AAL Parameters – See Q.2931 AAL Parameters information element.

- Bearer Capability – See Q.2931 Broadband Bearer Capability parameter.

- Calling Party Number – See Q.2931 Calling Party Number parameter.

- Called Party Number – See Q.2931 Called Party Number parameter.

- Called Party Subaddress – See Q.2931 Called Party Subaddress parameter.

- Calling Party Subaddress – See Q.2931 Called Party Number parameter.

- Connection Identifier – See Q.2931 Connection Identifier information element.

- End-to-End Transit Delay – See Q.2931 End-to-End Transit Delay information element.

- QoS Parameter – See Q.2931 QoS parameter.

- CDVT descriptor – See Q.2931 CDVT descriptor.

- Generic Identifier Transport – See Q.2931 Generic Identifier Transport.

- ATM Traffic Descriptor – See ITU-T Q.2931.

- Alternative ATM Traffic Descriptor – See Q.2962.1 Alternative ATM Traffic Descriptor information element.

- Minimum Acceptable ATM Traffic Descriptor – See Q.2962.1 Minimum Acceptable ATM Traffic Descriptor information element.

- Transit Network Selection – See Q.2931 Transit Network Selection information element.

ITU-T Q.2763 supports interworking between N-ISDN and B-ISDN. As a result, parameters in support of N-ISDN are carried in B-ISUP. The CCF/SSF receives an IAM message from a B-ISUP interface and this message can contain the following information:

–       Forward Call indicators – See Q.2763 Forward Narrow-band Interworking Indicators parameter. The caller's access is identified as ISDN or non-ISDN, and an indication is given of whether an end-to-end SS No. 7 supported connection is required.

–       Forward Call indicators – See Q.2763 National International Call Indicators parameter. The caller is identified as national or international.

–       Narrow-band Bearer Capability – See Q.2763 Narrow-band Bearer Capability. For the purposes of IN Capability Set for B-ISDN, this parameter identifies the call as circuit-mode/speech, circuit-mode/3.1 kHz audio, circuit-mode/unrestricted digital information (64 kbit/s), or circuit-mode/restricted digital information.

–       Called party number – See Q.2763 Called Party Number parameter.

–       Calling party number – See Q.2763 Calling Party Number Parameter.

–       Generic Number – See Q.2763 Additional Calling Party Number.

–       Charge number – See Q.2763 Charged Party Identification.

–       Carrier selection – See Q.2763 Transit Network Selection parameter. This parameter, if present, identifies the Carrier Identification Code.

–       Feature Code – See Q.2763 Service Activation parameter.

–       Location Number – See Q.2763 Location Number signalling information. Used if the calling party is a mobile subscriber.

–       Called Directory Number – See Q.2769.1 Called Directory Number.

–       Number Portability Forward Information – See Q.2769.1 Number Portability Forward Information.

–       Redirecting Party ID – See Q.2763 Redirecting Number.

–       Redirection Information – See Q.2763 Redirection Information.

–       USI Information – See Q.2763 Narrow-band Bearer Capability.

–       Other parameters may be included in the IAM. These parameters may be included because of features provided by other switches in the connection (e.g. information relating to the call being forwarded).

ITU-T Q.2763 supports the services of B-ISDN. As a result, information elements in support of B-ISDN services are carried through B-ISUP. The CCF/SSF receives an IAM message from a B-ISUP interface and this IAM message can contain the following information:

–       AAL Parameters – See Q.2763 AAL Parameters parameter field.

–       ATM Cell Rate – See Q.2763 ATM Cell Rate parameter field.

–       Additional ATM Cell Rate – See Q.2763 Additional ATM Cell Rate parameter field.

–       Alternative ATM Cell Rate – See Q.2763 Alternative ATM Cell Rate parameter field.

–       Minimum ATM Cell Rate – See Q.2763 Minimum ATM Cell Rate parameter field.

–       Broadband Bearer Capability – See Q.2763 Broadband Bearer Capability parameter.

–       Calling Party Number – See Q.2763 Calling Party Number parameter.

–       AESA for Calling Party – See Q.2763 AESA for Calling Party parameter.

–       Called Party Number – See Q.2763 Called Party Number parameter.

–       AESA for Called Party – See Q.2763 AESA for Called Party parameter.

–       Called Party Subaddress – See Q.2763 Called Party Subaddress parameter.

- Calling Party Subaddress – See Q.2763 Calling Party Number parameter.

- Connection Identifier – See Q.2763 Connection Identifier parameter field.

- Maximum End-to-End Transit Delay – See Q.2763 Maximum End-to-End Transit Delay parameter field.

- Propagation Delay Counter – See Q.2763 Propagation Delay Counter parameter field.

- QoS parameter – See Q.2763 Forward and Backward QoS class parameter.

- CDVT descriptor – See Q.2763 CDVT descriptor.

- Generic Identifier Transport – See Q.2763 Application generated identifier.

- Transit Network Selection – See Q.2763 Transit Network Selection parameter field.

## I.1.2    Collect_Information PIC

After the CCF/SSF determines that information collection is complete, it is assumed that the CCF/SSF may have collected the following additional information available associated with the originating call portion.

From a DSS2 interface that supports 64 kbit/s based ISDN circuit mode services, the collected information consists of one or more of the following:

- Access Codes within a Customized Dialling Plan (CDP) – See ITU-T Q.1290.

  The Customized Dialling Plan (CDP) in force may specify that after a given access code is dialled, more digits are to be collected according to the "normal dialling plan", i.e. the dialling plan in force. In this case, Access Code and Collected Address Information are known. If the CDP in force specifies that after a given access code is dialled, a variable number of digits are to be collected, then Access Code and Collected Digits are known.

- Feature Code – See Q.1290 Feature Code.

  If the numbering plan in force specifies that after a given feature code is dialled, more digits are to be collected according to the "normal dialling plan", then Feature Code and Collected Address Information are known. If the dialling plan in force specifies that after a given feature code is dialled, a variable number of digits are to be collected, then Feature Code and Collected Digits are known. The service associated with the feature code is dependent upon the users' service profile.

- Facility Code – See ITU-T Q.1290.

  This information may be provided if and when Q.2932 Facility information is supported on the interface.

- Feature Activation – See Q.2932 Facility information element and Q.932 Feature Activation information element.

  If the CDP in force specifies that after a given feature activator is received, more digits are to be collected according to the numbering plan, then Feature Activation Indicator and Collected Address Information are known.

  If the CDP in force specifies that after a given feature activator is received, a variable number of digits are to be collected, then Feature Activation Indicator and Collected Digits are known.

- Prefix – See ITU-T Q.1290.

– Carrier Access Code/Carrier Identification Code – See ITU-T Q.1290.

The caller may dial a Carrier Access Code (CAC) (e.g. a 101XXXX for use on this call). When the caller is served by a B-ISDN interface, a Carrier Identification Code, i.e. XXXX, may be received by the CCF/SSF within a FACILITY message.

– Collected Address Information – See ITU-T Q.1290.

Available as per the numbering plan.

– Collected Digits – See ITU-T Q.1290.

The numbering plan in force may specify that after a given Feature Activation, Feature Code, or Access Code within a CDP is dialled, a variable number of digits are to be collected. In this case, these collected digits are also known at this time.

### I.1.3    O_Active PIC

A service feature request is received from a party: [e.g. in a Q.2932 FACILITY message and Q.932 ISDN feature activator, and Q.932 HOLD or RETRIEVE message (for a terminating party only)].

– Feature Activation – See Q.2932 Facility information element and Q.932 Feature Activation information element.

If the CDP in force specifies that after a given feature activator is received, more digits are to be collected according to the numbering plan, then Feature Activation Indicator and Collected Address Information are known.

If the CDP in force specifies that after a given feature activator is received, a variable number of digits are to be collected, then Feature Activation Indicator and Collected Digits are known.

### I.1.4    O_Bearer_Modify PIC

After detecting the O_Modify_Request DP the CCF/SSF may have additional information available from the signalling interface. This information may include the following:

– ATM Cell Rate – See Q.2763 ATM Cell Rate parameter field.

– Additional ATM Cell Rate – See Q.2763 Additional ATM Cell Rate parameter field.

### I.1.5    O_Bearer_Active PIC

After detecting the O_Modify_Acknowledge DP the CCF/SSF may have additional information available from the signalling interface. This information may include the following:

– ATM Cell Rate – See Q.2763 ATM Cell Rate parameter field.

– Additional ATM Cell Rate – See Q.2763 Additional ATM Cell Rate parameter field.

## I.2    T_BCSM mapping of setup request primitive signalling information to PIC

### I.2.1    T_Null PIC

Once the CCF/SSF has detected the Termination_Attempt event it is assumed the following information is available and associated with the terminating portion of the call with restrictions as noted (information associated with the originating portion of the call as per the Send_Call PIC is assumed to be still available).

For a DSS2 interface that supports 64 kbit/s based ISDN circuit mode services or for a SS No. 7 B-ISUP interface that supports ISUP parameters:

– Calling Party Category – See Q.2763 Determined by the Class of Service information.

– Called Party Subaddress – See ITU-T Q.2931.

– Calling Party Subaddress – See ITU-T Q.2931.

– Location Number – See Q.2763 Location Number signalling information. Used if the calling party is a mobile subscriber.

– Original Called Party Number – See Q.2763 Original Called Number.

– Redirecting Party ID – See Q.2763 Redirecting Number.

– Redirection Information – See Q.2763 Redirection Information.

– USI Information – See Q.2763 Narrow-band Bearer Capability.

ITU-T Q.2931 supports the services of B-ISDN. As a result, information elements in support of B-ISDN services are carried through DSS2. The CCF/SSF receives a SETUP message from a DSS2 interface and this SETUP message can contain the following information:

– AAL Parameters – See Q.2931 AAL Parameters information element.

– Broadband Bearer Capability – See Q.2931 Broadband Bearer Capability parameter.

– Calling Party Number – See Q.2931 Calling Party Number parameter.

– Called Party Number – See Q.2931 Called Party Number parameter.

– Called Party Subaddress – See Q.2931 Called Party Subaddress parameter.

– Calling Party Subaddress – See Q.2931 Called Party Number parameter.

– Connection Identifier – See Q.2931 Connection Identifier information element.

– End-to-End Transit Delay – See Q.2931 End-to-End Transit Delay information element.

– QoS Parameter – See Q.2931 QoS parameter.

– CDVT descriptor – See Q.2931 CDVT descriptor.

– Generic Identifier Transport – See Q.2931 Generic Identifier Transport.

– ATM Traffic Descriptor – See Q.2931 ATM Traffic Descriptor.

– Alternative ATM Traffic Descriptor – See Q.2931 Alternative ATM Traffic Descriptor information element.

– Minimum Acceptable ATM Traffic Descriptor – See Q.2931 Minimum Acceptable ATM Traffic Descriptor information element.

– Transit Network Selection – See Q.2931 Transit Network Selection information element.

ITU-T Q.2763 supports the services of B-ISDN. As a result, information elements in support of B-ISDN services are carried through B-ISUP. The CCF/SSF receives an IAM message from a B-ISUP interface and this IAM message can contain the following information:

– AAL Parameters – See Q.2763 AAL Parameters parameter field.

– ATM Cell Rate – See Q.2763 ATM Cell Rate parameter field.

– Additional ATM Cell Rate – See Q.2763 Additional ATM Cell Rate parameter field.

– Alternative ATM Cell Rate – See Q.2763 Alternative ATM Cell Rate parameter field.

– Minimum ATM Cell Rate – See Q.2763 Minimum ATM Cell Rate parameter field.

– Broadband Bearer Capability – See Q.2763 Broadband Bearer Capability parameter.

– Calling Party Number – See Q.2763 Calling Party Number parameter.

– AESA for Calling Party – See Q.2763 AESA for Calling Party parameter.

– Called Party Number – See Q.2763 Called Party Number parameter.

– AESA for Called Party – See Q.2763 AESA for Called Party parameter.

– Called Party Subaddress – See Q.2763 Called Party Subaddress parameter.

– Calling Party Subaddress – See Q.2763 Calling Party Number parameter.

– Connection Identifier – See Q.2763 Connection Identifier parameter field.

– Maximum End-to-End Transit Delay – See Q.2763 Maximum End-to-End Transit Delay parameter field.

– Cumulative Transit Delay – See Q.2763 Propagation Delay Counter parameter field.

– QoS Class – See Q.2763 Forward and Backward QoS Class parameter field.

– CDVT descriptor – See Q.2763 CDVT descriptor.

– Generic Identifier Transport – See Q.2763 Application generated identifier.

– Transit Network Selection – See Q.2763 Transit Network Selection parameter field.

### I.2.2    T_Active PIC

A service feature request is received from a party: [e.g. in a Q.2932 FACILITY message and Q.932 ISDN feature activator, and Q.932 HOLD or RETRIEVE message (for a terminating party only)].

– Feature Activation – See Q.2932 Facility information element and Q.932 Feature Activation information element.

If the CDP in force specifies that after a given feature activator is received, more digits are to be collected according to the numbering plan, then Feature Activation Indicator and Collected Address Information are known.

If the CDP in force specifies that after a given feature activator is received, a variable number of digits are to be collected, then Feature Activation Indicator and Collected Digits are known.

### I.2.3    T_Bearer_Modify PIC

After detecting the T_Modify_Request DP the CCF/SSF may have additional information available from the signalling interface. This information may include the following:

– ATM Cell Rate – See Q.2763 ATM Cell Rate parameter field.

– Additional ATM Cell Rate – See Q.2763 Additional ATM Cell Rate parameter field.

### I.2.4    T_Bearer_Active PIC

After detecting the T_Modify_Acknowledge DP the CCF/SSF may have additional information available from the signalling interface. This information may include the following:

– ATM Cell Rate – See Q.2763 ATM Cell Rate parameter field.

– Additional ATM Cell Rate – See Q.2763 Additional ATM Cell Rate parameter field.


APPENDIX II

**Relationship of DP criteria to Signalling Parameters**


This appendix provides examples of signalling information that may be used at selected Points in Call (PICs) to establish a connection under control of service logic.

### II.1    Relationship of DP criteria to signalling parameters

### II.1.1    Analyse_Information PIC

Information is being analysed and/or translated according to service subscription and access parameters. After the CCF/SSF determines the information has been analysed, the CCF/SSF may have analysis results associated with selected DP Criteria for the originating call portion. Following are examples of analysis results that may be returned for each DP Criteria for the connect operation:

- AAL Parameters DP Criteria:
  - VPCI/VCI to be returned to the connection originator in a DSS2 Call Proceeding Message or in a B-ISUP IAM Acknowledge message.
  - Cause value to be returned to the connection originator in a Release Message.
- ATM Traffic Descriptor, Alternative ATM Traffic Descriptor, Minimum Acceptable ATM Traffic Descriptor, ATM Cell Rate, Additional ATM Cell Rate, Alternative ATM Cell Rate, Minimum ATM Cell Rate DP Criteria:
  - VPCI/VCI to be returned to the connection originator in the DSS2 Call Proceeding Message or in the B-ISUP IAM Acknowledge message.
  - Cell Rate to be forwarded toward the destination in a DSS2 SETUP or a B-ISUP IAM. Also used at the O_Answer DP as the Cell Rate possibly returned to the connection originator in the DSS2 CONNECT message or B-ISUP ANSwer Message.
  - Cause value to be returned to the connection originator in a Release Message.
- Broadband Bearer Capability DP Criteria:
  - VPCI/VCI to be returned to the connection originator in the DSS2 Call Proceeding Message or in the B-ISUP IAM Acknowledge message.
  - Cell Rate to be forwarded toward the destination in a DSS2 SETUP or a B-ISUP IAM. Also used at the O_Answer DP as the Cell Rate possibly returned to the connection originator in the DSS2 CONNECT message or B-ISUP ANSwer Message.
  - Cause value to be returned to the connection originator in a Release Message.
- Addressing/Numbering Plan Identification (called party) DP Criteria:
  - VPCI/VCI to be returned to the connection originator in the DSS2 Call Proceeding Message or in the B-ISUP IAM Acknowledge message.
  - Cell Rate to be forwarded toward the destination in a DSS2 SETUP or a B-ISUP IAM. Also used at the O_Answer DP as the Cell Rate possibly returned to the connection originator in a DSS2 CONNECT message or in a B-ISUP ANSwer Message.
  - Called Party Address (routing address) to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
  - Called Party Subaddress to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
  - Calling Party Subaddress to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
  - Transit Network Selection parameter to be forwarded toward the destination in a B-ISUP IAM.
  - Cause value to be returned to the connection originator in a Release Message.
- Specific Called Party Digit Strings DP Criteria:
  - VPCI/VCI to be returned to the connection originator in a DSS2 Call Proceeding Message or in a B-ISUP IAM Acknowledge message.
  - Called Party Address (routing address) to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
  - Called Party Subaddress to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
  - Calling Party Subaddress to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
  - Transit Network Selection parameter to be forwarded toward the destination in a B-ISUP IAM.

– Cause value to be returned to the connection originator in a Release Message.

- Specific Called Party Address DP Criteria:
  – VPCI/VCI to be returned to the connection originator in a DSS2 Call Proceeding Message or in a B-ISUP IAM Acknowledge message.
  – Cell Rate to be forwarded toward the destination in a DSS2 SETUP or a B-ISUP IAM. Also used at the O_Answer DP as the Cell Rate possibly returned to the connection originator in a DSS2 CONNECT message or in a B-ISUP ANSwer Message.
  – Called Party Address (routing address) to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
  – Called Party Subaddress to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
  – Calling Party Subaddress to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
  – Transit Network Selection parameter to be forwarded toward the destination in a B-ISUP IAM.
  – Cause value to be returned to the connection originator in a Release Message.

- Called Party Subaddress DP Criteria:
  – VPCI/VCI to be returned to the connection originator in the DSS2 Call Proceeding Message or in the B-ISUP IAM Acknowledge message.
  – Called Party Address (routing address) to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
  – Called Party Subaddress to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
  – Calling Party Subaddress to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
  – Transit Network Selection parameter to be forwarded toward the destination in a B-ISUP IAM.
  – Cause value to be returned to the connection originator in a Release Message.

- Addressing/Numbering Plan Identification (calling party) DP Criteria:
  – VPCI/VCI to be returned to the connection originator in the DSS2 Call Proceeding Message or in the B-ISUP IAM Acknowledge message.
  – Cell Rate to be forwarded toward the destination in a DSS2 SETUP or a B-ISUP IAM. Also used at the O_Answer DP as the Cell Rate possibly returned to the connection originator in a DSS2 CONNECT message or in a B-ISUP ANSwer Message.
  – Calling Party Address to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
  – Calling Party Subaddress to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
  – Transit Network Selection parameter to be forwarded toward the destination in a B-ISUP IAM.
  – Cause value to be returned to the connection originator in a Release Message.

- Specific Calling Party Digit Strings DP Criteria:
    - VPCI/VCI to be returned to the connection originator in a DSS2 Call Proceeding Message or in a B-ISUP IAM Acknowledge message.
    - Cell Rate to be forwarded toward the destination in a DSS2 SETUP or a B-ISUP IAM. Also used at the O_Answer DP as the Cell Rate possibly returned to the connection originator in a DSS2 CONNECT message or in a B-ISUP ANSwer Message.
    - Calling Party Address to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
    - Calling Party Subaddress to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
    - Transit Network Selection parameter to be forwarded toward the destination in a B-ISUP IAM.
    - Cause value to be returned to the connection originator in a Release Message.
- Specific Calling Party Address DP Criteria:
    - VPCI/VCI to be returned to the connection originator in the DSS2 Call Proceeding Message or in the B-ISUP IAM Acknowledge message.
    - Cell Rate to be forwarded toward the destination in a DSS2 SETUP or a B-ISUP IAM. Also used at the O_Answer DP as the Cell Rate possibly returned to the connection originator in the DSS2 CONNECT message or B-ISUP ANSwer Message.
    - Calling Party Address to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
    - Calling Party Subaddress to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
    - Transit Network Selection parameter to be forwarded toward the destination in a B-ISUP IAM.
    - Cause value to be returned to the connection originator in a Release Message.
- Calling Party Subaddress DP Criteria:
    - VPCI/VCI to be returned to the connection originator in the DSS2 Call Proceeding Message or in the B-ISUP IAM Acknowledge message.
    - Cell Rate to be forwarded toward the destination in a DSS2 SETUP or a B-ISUP IAM. Also used at the O_Answer DP as the Cell Rate possibly returned to the connection originator in the DSS2 CONNECT message or B-ISUP ANSwer Message.
    - Calling Party Address to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
    - Calling Party Subaddress to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
    - Transit Network Selection parameter to be forwarded toward the destination in a B-ISUP IAM.
    - Cause value to be returned to the connection originator in a Release Message.
- Specific Connection Identifier DP Criteria:
    - VPCI/VCI to be returned to the connection originator in the DSS2 Call Proceeding Message or in the B-ISUP IAM Acknowledge message.
    - Cell Rate to be forwarded toward the destination in a DSS2 SETUP or a B-ISUP IAM. Also used at the O_Answer DP as the Cell Rate possibly returned to the connection originator in the DSS2 CONNECT message or B-ISUP ANSwer Message.
    - Cause value to be returned to the connection originator in a Release Message.

- End-to-End Transit Delay, Maximum End-to-End Transit Delay DP Criteria:
    – VPCI/VCI to be returned to the connection originator in the DSS2 Call Proceeding Message or in the B-ISUP IAM Acknowledge message.
    – Cell Rate to be forwarded toward the destination in a DSS2 SETUP or a B-ISUP IAM. Also used at the O_Answer DP as the Cell Rate possibly returned to the connection originator in the DSS2 CONNECT message or B-ISUP ANSwer Message.
    – Cumulative Transit Delay to be included in a DSS2 SETUP or a B-ISUP IAM.
    – Cause value to be returned to the connection originator in a Release Message.
- QoS Class DP Criteria:
    – VPCI/VCI to be returned to the connection originator in the DSS2 Call Proceeding Message or in the B-ISUP IAM Acknowledge message.
    – Cell Rate to be forwarded toward the destination in a DSS2 SETUP or a B-ISUP IAM. Also used at the O_Answer DP as the Cell Rate possibly returned to the connection originator in the DSS2 CONNECT message or B-ISUP ANSwer Message.
    – Cause value to be returned to the connection originator in a Release Message.
- TNS Parameter DP Criteria:
    – VPCI/VCI to be returned to the connection originator in the DSS2 Call Proceeding Message or in the B-ISUP IAM Acknowledge message.
    – Called Party Address (routing address) or Subaddress to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
    – Called Party Subaddress to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.

## II.1.2    Authorize_Termination_Attempt PIC

The authority to route this connection to the terminating access is verified. Following are examples of information for selected DP criteria that may be received from the O_BCSM to proceed with the connection:

- AAL Parameters DP Criteria:
    – VPCI/VCI to be forwarded toward the destination in a DSS2 SETUP Message or in a B-ISUP IAM message.
- ATM Traffic Descriptor, Alternative ATM Traffic Descriptor, Minimum Acceptable ATM Traffic Descriptor, ATM Cell Rate, Additional ATM Cell Rate, Alternative ATM Cell Rate, Minimum ATM Cell Rate DP Criteria:
    – VPCI/VCI to be forwarded toward the destination in a DSS2 SETUP Message or in a B-ISUP IAM message.
    – Cell Rate to be forwarded toward the destination in a DSS2 SETUP or a B-ISUP IAM. Also used at the T_Answer DP as the Cell Rate possibly returned to the connection originator in the DSS2 CONNECT message or B-ISUP ANSwer Message.
- Broadband Bearer Capability DP Criteria:
    – VPCI/VCI to be forwarded toward the destination in a DSS2 SETUP Message or in a B-ISUP IAM message.
    – Cell Rate to be forwarded toward the destination in a DSS2 SETUP or a B-ISUP IAM. Also used at the T_Answer DP as the Cell Rate possibly returned to the connection originator in the DSS2 CONNECT message or B-ISUP ANSwer Message.

- Addressing/Numbering Plan Identification (called party) DP Criteria:
    - VPCI/VCI to be forwarded toward the destination in a DSS2 SETUP Message or in a B-ISUP IAM message.
    - Cell Rate to be forwarded toward the destination in a DSS2 SETUP or a B-ISUP IAM. Also used at the T_Answer DP as the Cell Rate possibly returned to the connection originator in a DSS2 CONNECT message or in a B-ISUP ANSwer Message.
    - Called Party Address (routing address) to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
    - Called Party Subaddress to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
    - Transit Network Selection parameter to be forwarded toward the destination in a B-ISUP IAM.

- Specific Called Party Digit Strings DP Criteria:
    - VPCI/VCI to be forwarded toward the destination in a DSS2 SETUP Message or in a B-ISUP IAM message.
    - Cell Rate to be forwarded toward the destination in a DSS2 SETUP or a B-ISUP IAM. Also used at the T_Answer DP as the Cell Rate possibly returned to the connection originator in a DSS2 CONNECT message or in a B-ISUP ANSwer Message.
    - Called Party Address (routing address) to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
    - Called Party Subaddress to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
    - Transit Network Selection parameter to be forwarded toward the destination in a B-ISUP IAM.

- Specific Called Party Address DP Criteria:
    - VPCI/VCI to be forwarded toward the destination in a DSS2 SETUP Message or in a B-ISUP IAM message.
    - Cell Rate to be forwarded toward the destination in a DSS2 SETUP or a B-ISUP IAM. Also used at the T_Answer DP as the Cell Rate possibly returned to the connection originator in a DSS2 CONNECT message or in a B-ISUP ANSwer Message.
    - Called Party Address (routing address) to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
    - Called Party Subaddress to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
    - Transit Network Selection parameter to be forwarded toward the destination in a B-ISUP IAM.

- Called Party Subaddress DP Criteria:
    - VPCI/VCI to be forwarded toward the destination in a DSS2 SETUP Message or in a B-ISUP IAM message.
    - Cell Rate to be forwarded toward the destination in a DSS2 SETUP or a B-ISUP IAM. Also used at the T_Answer DP as the Cell Rate possibly returned to the connection originator in a DSS2 CONNECT message or in a B-ISUP ANSwer Message.
    - Called Party Address (routing address) to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.
    - Called Party Subaddress to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.

– Transit Network Selection parameter to be forwarded toward the destination in a B-ISUP IAM.

• End-to-End Transit Delay, Maximum End-to-End Transit Delay DP Criteria:

– VPCI/VCI to be forwarded toward the destination in a DSS2 SETUP Message or in a B-ISUP IAM message.

– Cell Rate to be forwarded toward the destination in a DSS2 SETUP or a B-ISUP IAM. Also used at the T_Answer DP as the Cell Rate possibly returned to the connection originator in the DSS2 CONNECT message or B-ISUP ANSwer Message.

• QoS Class DP Criteria:

– VPCI/VCI to be forwarded toward the destination in a DSS2 SETUP Message or in a B-ISUP IAM message.

– Cell Rate to be forwarded toward the destination in a DSS2 SETUP or a B-ISUP IAM. Also used at the T_Answer DP as the Cell Rate possibly returned to the connection originator in the DSS2 CONNECT message or B-ISUP ANSwer Message.

• TNS Parameter DP Criteria:

– VPCI/VCI to be forwarded toward the destination in a DSS2 SETUP Message or in a B-ISUP IAM message.

– Called Party Address (routing address) to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.

– Called Party Subaddress to be forwarded toward the destination in a DSS2 SETUP or in a B-ISUP IAM.

# SERIES OF ITU-T RECOMMENDATIONS

Series A   Organization of the work of ITU-T

Series B   Means of expression: definitions, symbols, classification

Series C   General telecommunication statistics

Series D   General tariff principles

Series E   Overall network operation, telephone service, service operation and human factors

Series F   Non-telephone telecommunication services

Series G   Transmission systems and media, digital systems and networks

Series H   Audiovisual and multimedia systems

Series I   Integrated services digital network

Series J   Transmission of television, sound programme and other multimedia signals

Series K   Protection against interference

Series L   Construction, installation and protection of cables and other elements of outside plant

Series M   TMN and network maintenance: international transmission systems, telephone circuits, telegraphy, facsimile and leased circuits

Series N   Maintenance: international sound programme and television transmission circuits

Series O   Specifications of measuring equipment

Series P   Telephone transmission quality, telephone installations, local line networks

**Series Q**   **Switching and signalling**

Series R   Telegraph transmission

Series S   Telegraph services terminal equipment

Series T   Terminals for telematic services

Series U   Telegraph switching

Series V   Data communication over the telephone network

Series X   Data networks and open system communications

Series Y   Global information infrastructure and Internet protocol aspects

Series Z   Languages and general software aspects for telecommunication systems