INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Q.2767.1

(05/98)

SERIES Q: SWITCHING AND SIGNALLING

Broadband ISDN – B-ISDN application protocols for the network signalling

---

Soft PVC capability

ITU-T Recommendation Q.2767.1

(Previously CCITT Recommendation)

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.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.1999
BROADBAND ISDN	Q.2000–Q.2999
General aspects	Q.2000–Q.2099
Signalling ATM adaptation layer (SAAL)	Q.2100–Q.2199
Signalling network protocols	Q.2200–Q.2299
Common aspects of B-ISDN application protocols for access signalling and network signalling and interworking	Q.2600–Q.2699
B-ISDN application protocols for the network signalling	**Q.2700–Q.2899**
B-ISDN application protocols for access signalling	Q.2900–Q.2999

For further details, please refer to ITU-T List of Recommendations.

ITU-T RECOMMENDATION Q.2767.1

SOFT PVC CAPABILITY

Summary

This Recommendation utilizes the normal procedures of Broadband ISDN User Part (B-ISUP) protocol in order to support soft Permanent Virtual Connections (soft PVCs) between their endpoints. The endpoints are responsible for maintaining the end-to-end circuit by setting up a new switched connection in case the existing switched connection is released or fails. Two types of soft PVC are supported: soft Permanent Virtual Path Connection (PVPC) and soft Permanent Virtual Channel Connection (PVCC). This Recommendation contains the additional message and parameter coding, procedures, ASE descriptions, and interworking mapping tables for the support of soft PVCC and soft PVPC services.

Source

ITU-T Recommendation Q.2767.1 was prepared by ITU-T Study Group 11 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on the 15th of May 1998.

FOREWORD

ITU (International Telecommunication Union) is the United Nations Specialized Agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the ITU. The 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 their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 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

The ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. The 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, the 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

Recommendation Q.2767.1

SOFT PVC CAPABILITY

(Geneva, 1998)

1 Scope

This Recommendation contains formats and procedures for supporting soft Permanent Virtual Connections (soft PVCs). Soft PVC capability utilizes the normal procedures of B-ISUP in order to control soft permanent virtual circuit connections between their endpoints. The endpoints are responsible for maintaining the end-to-end circuit by setting up a new switched connection in case the existing switched connection is released or fails.

The endpoints of a soft PVC are located in the exchanges to which the users of the soft PVC are connected. The endpoint is identifiable by addressing information contained in the call setup signalling, such as an E.164 number plus VPCI/VCI value.

Figure 1 identifies different reference points in a soft PVC using internal SVC connection switching and signalling.

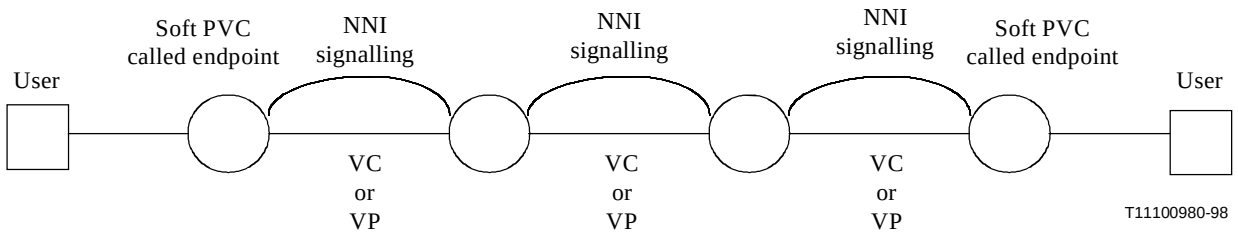

Figure 1/Q.2767.1 – Soft PVC configuration

Two types of soft PVC are supported:

– soft permanent virtual path connection (PVPC); and

– soft permanent virtual channel connection (PVCC).

This Recommendation contains the additional message and parameter coding, procedures, ASE descriptions and interworking mapping tables for the support of soft PVCC and soft PVPC services.

The procedures for control of soft PVCCs are applicable to point-to-point and point-to-multipoint procedures.

The procedures for control of soft PVPCs follow the additional procedures for switched virtual path connections in Recommendation Q.2766.1.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference 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.2723.1 (1996), *B-ISDN user part – Support of additional traffic parameters for sustainable cell rate and quality of service.*

– ITU-T Recommendation Q.2723.2 (1997), *Extensions to the B-ISDN user part – Support of ATM transfer capability in the broadband bearer capability parameter*.

– ITU-T Recommendation Q.2723.3 (1997), *Extensions to the B-ISDN user part – Signalling capabilities to support traffic parameters for the Available Bit Rate (ABR) ATM transfer capability*.

– ITU-T Recommendation Q.2723.4 (1997), *Extensions to the B-ISDN user part – Signalling capabilities to support traffic parameters for the ATM Block Transfer (ABT) ATM transfer capability*.

– ITU-T Recommendation Q.2723.6 (1998), *Extensions to the signalling system No. 7– B-ISDN user part (B-ISUP): Signalling capabilities to support the indication of the statistical bit rate configuration 2 (SBR 2) and 3 (SBR 3) ATM transfer capabilities*.

– ITU-T Recommendation Q.2724.1 (1996), *B-ISDN user part – Look-ahead without state change for the network node interface.*

– 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.2725.3 (1997), *Extensions to the B-ISDN user part – Modification procedures for sustainable cell rate parameters*.

– ITU-T Recommendation Q.2725.4 (1998), *Extensions to the signalling system No. 7 B-ISDN user part (B-ISUP) – Modification procedures with negotiation.*

– ITU-T Recommendation Q.2726.1 (1996), *B-ISDN user part – ATM end system address.*

– ITU-T Recommendation Q.2726.2 (1996), *B-ISDN user part – Call priority.*

– ITU-T Recommendation Q.2726.3 (1996), *B-ISDN user part – Network generated session identifier.*

– ITU-T Recommendation Q.2764 (1995), *Signalling System No. 7 B-ISDN User Part (B-ISUP) – Basic call procedures.*

– ITU-T Recommendation Q.2766.1 (1998), *Switched virtual path capability*.

– ITU-T Recommendation Q.2931 (1995), *Digital subscriber Signalling System No. 2 – User-Network Interface (UNI) layer 3 specification for basic call/connection control.*

3 Definitions

This Recommendation defines the following terms:

3.1 soft PVC called endpoint: Information sent in the forward (or backward) direction indicating the VPCI or VPCI/VCI values to be used (or used) for the connection segment between the soft PVC called endpoint and a user.

3.2 soft PVC calling endpoint: Information sent in the forward direction indicating the VPCI or VPCI/VCI values used for the connection segment between the soft PVC calling endpoint and a user.

4 Abbreviations

This Recommendation uses the following abbreviations:

NNI Network-Node Interface

PVC Permanent Virtual Connection

PVCC Permanent Virtual Channel Connection

PVPC Permanent Virtual Path Connection

SVC Switched Virtual Channel

UNI User-Network Interface

VCI Virtual Channel Identifier

VPCI Virtual Path Connection Identifier

5 B-ISDN user part messages and parameters

The modifications to parameters and messages described in this clause are required to support soft PVCs.

5.1 Formats

5.1.1 Soft PVC called endpoint parameter

The format of the Soft PVC called endpoint parameter field is shown in Figure 2.

The parameter name code allocated to the Soft PVC called endpoint parameter is 0111 0110.

8	7	6	5	4	3	2	1
1 ext.	Coding standard		Reserved				
Selection type							
Subfield indicator							
VPCI value							
Subfield indicator							
VCI value							

Figure 2/Q.2767.1 – Soft PVC called endpoint parameter field

Subfields are coded as follows:

a) *Selection type*

0000 0000 Any value

0000 0010 Required value

0000 0100 Assigned value

All other values reserved.

b) *Subfield indicator*

0000 0001 VPCI value

0000 0010 VCI value

All other values reserved.

c) *VPCI value*

Two-octet value coded as in the Connection Element Identifier (see Recommendation Q.2763).

d) *VCI value*

Two-octet value coded as in the Connection Element Identifier (see Recommendation Q.2763).

5.1.2 Soft PVC calling endpoint parameter

The format of the Soft PVC calling endpoint parameter field is shown in Figure 3.

The parameter name code allocated to the Soft PVC calling endpoint parameter is 0111 1001.

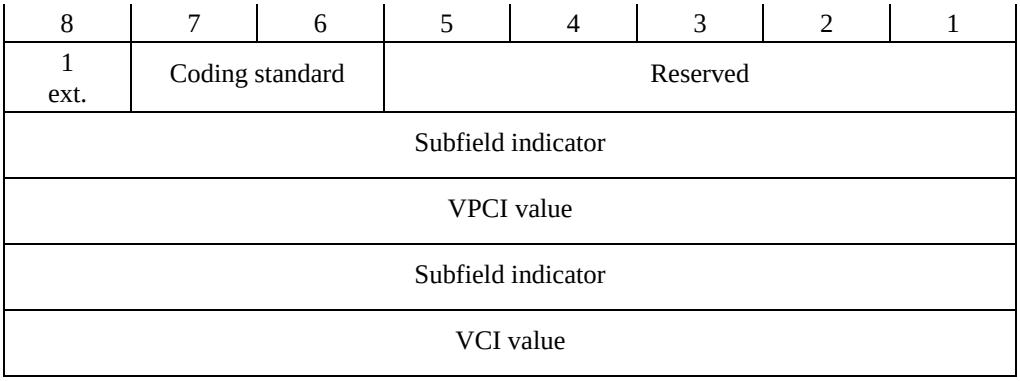

Figure 3/Q.2767.1 – Soft PVC calling endpoint parameter field

Subfields are coded as follows:

a) *Subfield indicator*

0000 0001 VPCI value

0000 0010 VCI value

All other values reserved.

b) *VPCI value*

Two-octet value coded as in the Connection Element Identifier (see Recommendation Q.2763).

c) *VCI value*

Two-octet value coded as in the Connection Element Identifier (see Recommendation Q.2763).

6 Application process procedures

6.1 Connection setup

6.1.1 Calling endpoint exchange

The request to set up soft PVC is transmitted from the management entity to the application process and the request includes an indication whether a soft PVC is a soft PVCC or soft PVPC.

The soft PVC calling endpoint exchange shall initiate connection establishment by generating a Set_Up request primitive to B-ISUP, containing the Soft PVC called endpoint parameter. The Called Party Number shall contain the address corresponding to the soft PVC called endpoint. The Calling Party Number shall contain the address corresponding to the soft PVC calling endpoint.

The use of soft PVC procedures is indicated by the inclusion of the Soft PVC called endpoint parameter.

If the VPCI/VCI at the destination must be conveyed to the soft PVC called endpoint exchange, then this information is also carried in the Soft PVC called endpoint parameter. In this case, the selection type field should be set to "required value" and the Soft PVC called endpoint parameter shall indicate the VPCI value in case of setup of a soft PVPC or the VPCI/VCI value in case of setup of a soft PVCC, respectively.

In the case where the VPCI/VCI shall be determined by the soft PVC called endpoint exchange, the Soft PVC called endpoint parameter shall be included with the selection type set to "any value". In this case, no VPCI/VCI shall be indicated.

The Soft PVC calling endpoint parameter may be included on an optional basis.

For a soft PVCC call, the normal procedures in Recommendation Q.2764 are used. For a soft PVPC call, the procedures in Recommendation Q.2766.1 are used.

6.1.2 Intermediate national exchange

For a soft PVCC call, the intermediate national exchange shall use the normal procedures as in Recommendation Q.2764 in order to set up the connection. For a soft PVPC call, the intermediate national exchange shall use the procedures in Recommendation Q.2766.1 to set up the connection. The presence of the Soft PVC called endpoint parameter indicates that the call is supporting the soft PVC capability.

6.1.3 Outgoing international exchange

For a soft PVCC call, the outgoing international exchange shall use the normal procedures as in Recommendation Q.2764 in order to set up the connection. For a soft PVPC call, the outgoing international exchange shall use the procedures in Recommendation Q.2766.1 to set up the connection. The presence of the Soft PVC called endpoint parameter indicates that the call is supporting the soft PVC capability.

6.1.4 Intermediate international exchange

For a soft PVCC call, the intermediate international exchange shall use the normal procedures as in Recommendation Q.2764 in order to set up the connection. For a soft PVPC call, the intermediate international exchange shall use the procedures in Recommendation Q.2766.1 to set up the connection. The presence of the Soft PVC called endpoint parameter indicates that the call is supporting the soft PVC capability.

If the soft PVC capability is not supported by the receiving network, the call shall be cleared with Cause No. 21 "call rejected".

6.1.5 Incoming international exchange

For a soft PVCC call, the incoming international exchange shall use the normal procedures as in Recommendation Q.2764 in order to set up the connection. For a soft PVPC call, the incoming international exchange shall use the procedures in Recommendation Q.2766.1 to set up the connection. The presence of the Soft PVC called endpoint parameter indicates that the call is supporting the soft PVC capability.

If the soft PVC capability is not supported by the receiving network, the call shall be cleared with Cause No. 21 "call rejected".

6.1.6 Called endpoint exchange

The soft PVC called endpoint exchange shall terminate call setup without sending an indication to the user, since no signalling is required for the connection segment between the endpoint and user.

If the selection type in the Soft PVC called endpoint parameter is set to "any value", the soft PVC called endpoint exchange shall select a pre-determined VPCI/VCI. If the selection type in the Soft PVC called endpoint parameter is set to "required value", the VPCI/VCI indicated in the Soft PVC called endpoint parameter is used to associate the call with a particular connection segment at the soft PVC called endpoint.

The soft PVC called endpoint exchange shall verify the authorization for the call based on the Calling Party Number, the Called Party Number and the Soft PVC called endpoint parameter. If the information is not correct, the call shall be cleared with Cause No. 21 "call rejected".

If the call type is incompatible with the terminating access (e.g., call setup for a soft PVPC attempting to connect to a soft PVCC access link), then the call shall be cleared with Cause No. 21 "call rejected".

If the selection type in the Soft PVC called endpoint parameter is set to "any value" and the VPCI/VCI is included, the call shall be cleared with Cause No. 111 "Protocol error, unspecified".

If the VPCI/VCI respectively VPCI is not available at the terminating access, the call shall be cleared with Cause No. 34 "No circuit/channel available".

6.2 Answer

6.2.1 Called endpoint exchange

Upon successful completion of call setup of the soft PVC, the soft PVC called endpoint exchange shall send the Answer request primitive back towards the soft PVC calling endpoint exchange. The Soft PVC called endpoint parameter shall be included in the Answer request primitive, with the indication of the VPCI in case of soft PVPC setup or VPCI/VCI in case of soft PVCC setup, respectively, used at the soft PVC called endpoint. The selection type field shall be set to "assigned value".

6.2.2 Calling endpoint exchange

Upon receiving the Answer indication primitive, the soft PVC calling endpoint exchange shall send an indication to management process.

If the selection type in the Soft PVC called endpoint parameter is not set to "assigned value", then the call shall be cleared with Cause No. 111 "Protocol error, unspecified".

6.2.3 Other types of exchanges

The procedures of Recommendations Q.2764 or Q.2766.1 apply.

6.3 Unsuccessful connection setup

6.3.1 Calling endpoint exchange

The procedures of Recommendations Q.2764 or Q.2766.1 for the originating exchange apply with the following additions:

If all attempts to reroute the connection fail, the exchange shall follow the procedures as described in 6.5.1.

6.3.2 Other type of exchanges

The procedures of Recommendations Q.2764 or Q.2766.1 apply.

6.4 Storage of call setup information

The soft PVC calling endpoint exchange shall store the information of the IAM for as long as the soft PVCC or soft PVPC is offered to the customer. This allows re-establishment of the connection after failure.

6.5 Release

6.5.1 Release within the network

In case of failure, the connection may be released by the detecting node in accordance with the procedures of Recommendations Q.2764 or Q.2766.1, as appropriate.

Upon receipt of a first Release indication primitive (or Incoming Resources Rejected indication primitive), the soft PVC calling endpoint exchange shall send an indication to the management process, and depending on the cause value, may attempt to re-establish the connection immediately by using the call setup procedures as defined in 6.1 above.

Upon receipt of the subsequent Release indication primitive (or Incoming Resources Rejected indication primitive), and if the maximum number of retries has not been reached, the exchange may, depending on the cause value, start the timer "Wait for Retry". The maximum number of retries is determined specifically for that soft PVC by the operator. If the maximum number of retries has been reached and the connection is not re-established or a specific cause value to stop the re-establishment is received, the exchange shall send another indication to the management process.

When the timer "Wait for Retry" expires, the exchange shall attempt to re-establish the connection by using the call setup procedures defined in 6.1 above.

6.5.2 Release by the calling endpoint exchange

The soft PVC calling endpoint exchange may release the connection, based on a request from the management process. At this point, the calling endpoint exchange may release all information associated with the call.

7 Application service elements and primitives

The following subclause identifies impacts on the B-ISUP Application Service Elements and the primitives exchanged between ASEs as shown in Recommendation Q.2764.

7.1 Primitives between SACF and application process

7.1.1 Set_Up Request/Indication primitive

Table 1 shows new parameters that must be added to the Set_Up Request/Indication primitive.

Table 1/Q.2767.1 – Parameters for Set_Up Request/Indication primitive

Set_Up Request/Indication	B-ISDN	N-ISDN
Soft PVC called endpoint	O (Note)	–
Soft PVC calling endpoint	O	–
NOTE – This parameter is required for the setup of the soft PVC.		

7.1.2 Answer Request/Indication primitive

Table 2 shows new parameters that must be added to the Answer Request/Indication primitive.

Table 2/Q.2767.1 – Parameters for Answer Request/Indication primitive

Answer Request/Indication	B-ISDN	N-ISDN
Soft PVC called endpoint	O	–

7.2 Primitives between BCC ASE and SACF

7.2.1 Link_Set_Up Request/Indication primitive

Table 3 shows new parameters that must be added to the Link_Set_Up Request/Indication primitive.

Table 3/Q.2767.1 – Parameters for Link_Set_Up Request/Indication primitive

Link_Set_Up Request/Indication
Soft PVC called endpoint
Soft PVC calling endpoint

7.2.2 Link_Information Request/Indication primitive

Table 4 shows new parameters that must be added to the Link_Information Request/Indication primitive.

Table 4/Q.2767.1 – Parameters for Link_Information Request/Indication primitive

Link_Information Request/Indication
Soft PVC called endpoint

7.3 ASE descriptions

No changes are required to the ASE descriptions for BCC or CC ASEs.

8 Instruction indicators and interworking

8.1 Interworking with nodes not supporting this feature

The instruction indicators shall be set so as to cause the call to be released at endpoint and gateway exchanges, but passed through transit exchanges. The instruction indicators for the Soft PVC called endpoint parameter, as shown in Appendix I, shall be set to be passed through transit exchanges, and to cause release if pass on is not possible.

As a network option, the instruction indicators for the Soft PVC called endpoint parameter can be set to be released at transit exchanges.

8.2 Interworking with DSS 2

There is no interworking with DSS 2, since there is no signalling required for the connection segment between the endpoint and user.

8.3 Interworking with narrow-band ISDN

There is no interworking with narrow-band ISDN, since soft PVC is not supported in narrow-band. The Soft PVC called endpoint parameter shall be set to cause release at the broadband/narrow-band interworking point.

The instruction indicators for the Soft PVC called endpoint parameter shall be coded as shown in Appendix I.

As a network option, the instruction indicators for the Soft PVC called endpoint parameter can be set to be released at transit exchanges.

8.4 Interaction with other capabilities

8.4.1 Point-to-multipoint

The procedures of Recommendation Q.2722.1 can be used with the soft PVCC.

8.4.2 Traffic parameters

The procedures of Recommendations Q.2723.1, Q.2723.2, Q.2723.3, Q.2723.4, and Q.2723.6 can be used with the soft PVCC.

The procedures of Recommendations Q.2723.1, Q.2723.3, Q.2723.4, and Q.2723.6 can be used with the soft PVPC.

8.4.3 Look-ahead

The procedures of Recommendation Q.2724.1 can be used with the soft PVCC and soft PVPC.

8.4.4 Negotiation of traffic characteristics during call setup

The procedures of Recommendation Q.2725.1 can be used with the soft PVCC and soft PVPC.

8.4.5 Modification of traffic characteristics during the active phase of the call

The procedures of Recommendations Q.2725.2, Q.2725.3, and Q.2725.4 can be used with the soft PVCC and soft PVPC.

8.4.6 ATM End System Address (AESA)

The procedures of Recommendation Q.2726.1 can be used with the soft PVCC and soft PVPC.

8.4.7 Call priority

The procedures of Recommendation Q.2726.2 can be used with the soft PVCC and soft PVPC.

8.4.8 Network generated session ID

The procedures of Recommendation Q.2726.3 can be used with the soft PVCC and soft PVPC.

8.4.9 Frame relay

For further study.

9 Timers

This clause specifies the additional Application Process timer relevant for B-ISUP. For the timer, the timeout value, cause for initiation of that timer, normal termination event(s) for the timer, and actions to be performed on expiry of the timer, are given in Table 5. Furthermore, in the last column, reference to the relevant Application Process description, or ASE description is given, where a full description of the procedure is to be found.

Table 5/Q.2767.1 – Additional timer in B-ISUP

Symbol (name)	Timeout value	Cause for initiation	Normal termination	At expiry	Reference
Wait for Retry (T44b)	0-? (Note)	If the (re-)establish-ment of a soft PVC fails and when a Release or IAM reject message is received in a soft PVC calling endpoint exchange.	–	Re-establish the soft PVC.	6.5.1
NOTE – Operator dependent.					

APPENDIX I

Setting of instruction indicators

The setting of the instruction indicators for the Soft PVC called endpoint parameter and Soft PVC calling endpoint parameter is as follows:

Table I.1/Q.2767.1 – Coding of the instruction indicators

Parameter	Soft PVC called endpoint	Soft PVC calling endpoint
Pass on not possible ind.	Release call	Release call
Discard parameter ind.	Default	Default
Discard message ind.	Default	Default
Send notification ind.	Default	Default
Release call ind.	Release call	Release call
Transit at intermed. exchange ind.	Transit node interpretation (Note)	Transit node interpretation (Note)
Broadband/narrow-band interworking ind.	Release call	Release call
NOTE – As a network option, the transit at intermediate exchange indication can be set to "End node interpretation".		

APPENDIX II

Retry decision

A different decision may be required, if the failure is during:

- *activation*
  - the soft PVC was not active before, so a configuration error is quite possible;
  - the operator is waiting for an answer: if the problem is no configuration error after all, or if the operator wants to retry anyway, the operator can do the retry; or
- *re-establishment*
  - the soft PVC was active before, so a configuration error is not likely (but possible);
  - the operator is not "handling" the soft PVC, so the node should retry.

Taking this into account, the following guidelines can be established to decide on a retry during:

- *activation*

  Retry if:
  - unexpected cause value (-> assume that this is caused by a temporary failure);
  - cause indicates a temporary failure.

  Do **not** retry if:
  - cause possibly indicates a configuration problem;
  - cause indicates a "long term" failure.

- *re-establishment*

  Retry if:

  – unexpected cause (-> assume that this is caused by a temporary failure);
  – cause indicates a temporary failure;
  – cause *possibly* indicates a configuration problem.

  Do **not** retry if:

  – cause *certainly* indicates a configuration error;
  – cause indicates a "long term" failure.

For all undefined (reserved) cause values, the action is according to the "Unspecified" value within the class. See Table II.1.

Table II.1/Q.2767.1 – Retry decision on cause value

Value No.	Cause	Retry acti-vation (Y/N)	Retry Re-establ. (Y/N)	Remarks
001	Unallocated (unassigned) number	N	N	Configuration error: wrong destination DN
002	No route to specified transit network	N	Y	Temporary routing problem, Routing configuration error
003	No route to destination	N	Y	Temporary routing problem, Routing configuration error
004	Send special information tone	Y	Y	Not expected (not activated in soft PVC set-up)
005	Misdialled trunk prefix	N	N	Configuration error: wrong destination DN
006	Channel unacceptable	Y	Y	Not expected (ISDN channels)
007	Call awarded and being delivered in an established channel	Y	Y	Not expected (ISDN channels)
008	Pre-emption	Y	Y	Temporary resource problem
009	Pre-emption – circuit reserved for reuse	Y	Y	Temporary resource problem
010		Y	Y	reserved value: not expected, retry anyway
011		Y	Y	reserved value: not expected, retry anyway
012		Y	Y	reserved value: not expected, retry anyway
013		Y	Y	reserved value: not expected, retry anyway
014		Y	Y	reserved value: not expected, retry anyway
015		Y	Y	reserved value: not expected, retry anyway
016	Normal call clearing	N	N	Configuration error: wrong DN, error returned by non-soft PVC user
017	User busy	N	N	Configuration error: wrong DN, error returned by non-soft PVC user
018	No user responding	N	N	Configuration error: wrong DN, error returned by non-soft PVC user
019	No answer from user	N	Y	Temporary problem, Configuration error (wrong destination DN)
020	Subscriber absent	N	N	Configuration error: wrong DN, error returned by non-soft PVC user
021	Call rejected	N	N	soft PVC capability is not supported by the receiving network
022	Number changed	N	N	Configuration changed on B-side

Table II.1/Q.2767.1 – Retry decision on cause value *(continued)*

Value No.	Cause	Retry acti-vation (Y/N)	Retry Re-establ. (Y/N)	Remarks
023		Y	Y	reserved value: not expected, retry anyway
024		Y	Y	reserved value: not expected, retry anyway
025		Y	Y	reserved value: not expected, retry anyway
026	Non-selected user clearing	Y	Y	Not expected (for multipoint terminal only)
027	Destination out of order	N	Y	Temporary problem with soft PVC B-side, Configuration error (wrong destination DN)
028	Invalid number format (address incomplete)	N	N	Configuration error: wrong destination DN
029	Facility rejected	N	N	Configuration error: supplementary service not supported
030	Response to STATUS ENQUIRY	Y	Y	Not expected (response on status inquiry)
031	Normal, unspecified	Y	Y	Unspecified
032		Y	Y	reserved value: not expected, retry anyway
033		Y	Y	reserved value: not expected, retry anyway
034	No circuit/channel available	N	Y	VPCI/VCI respectively VPCI is not available at the terminating access
035	Requested VPCI/VCI not available	Y	Y	Glare case with SVC: always retry !
036	VPCI/VCI assignment failure	Y	Y	Glare case with SVC: always retry !
037	User cell rate not available	Y	Y	Glare case with SVC: always retry !
038	Network out of order	N	N	Long-term problem with the network
039	Permanent frame mode connection out of service	Y	Y	Not expected (response on status inquiry)
040	Permanent frame mode connection operational	Y	Y	Not expected (response on status inquiry)
041	Temporary failure	Y	Y	Temporary failure
042	Switching equipment congestion	N	N	Retry would only increase the problem ...
043	Access information discarded	N	Y	Configuration error: wrong DN, error returned by non-soft PVC user
044	Requested circuit/channel not available	N	N	Configuration error: wrong DN, error returned by non-soft PVC user

Table II.1/Q.2767.1 – Retry decision on cause value *(continued)*

Value No.	Cause	Retry acti-vation (Y/N)	Retry Re-establ. (Y/N)	Remarks
045	No VPCI/VCI available	Y	Y	Temporary resource problem
046	Precedence call blocked	Y	Y	Temporary resource problem
047	Resource unavailable, unspecified	Y	Y	Unspecified
048		N	Y	reserved value: not expected, retry anyway
049	Quality of service unavailable	N	N	Configuration error: QOS
050	Requested Facility not subscribed	N	N	Configuration error: soft PVC uses service which is not subscribed
051		N	Y	reserved value: not expected, retry anyway
052		N	Y	reserved value: not expected, retry anyway
053	Outgoing calls barred within CUG	N	N	Configuration error: default CUG should allow soft PVC
054		N	Y	reserved value: not expected, retry anyway
055	Incoming calls barred within CUG	N	N	Configuration error: default CUG should allow soft PVC
056		N	Y	reserved value: not expected, retry anyway
057	Bearer capability not authorized	N	N	Configuration error: soft PVC uses bearer capability which is not subscribed
058	Bearer capability not presently available	Y	Y	Temporary resource problem: bearer capability presently not available
059		N	Y	reserved value: not expected, retry anyway
060		N	Y	reserved value: not expected, retry anyway
061		N	Y	reserved value: not expected, retry anyway
062	Inconsistency in designated outgoing access information and subscriber class	N	N	Configuration error: CUG inconsistency
063	Service or option not available, unspecified	N	Y	Unspecified problem, Configuration problem
064		N	N	reserved value: not expected, do not retry
065	Bearer capability not implemented	N	N	Configuration error: wrong DN, error returned by non-soft PVC user Persistent error: not supported by transit switch
066	Channel type not implemented	N	N	Configuration error: wrong DN, error returned by non-soft PVC user

Table II.1/Q.2767.1 – Retry decision on cause value *(continued)*

Value No.	Cause	Retry acti-vation (Y/N)	Retry Re-establ. (Y/N)	Remarks
067		N	N	reserved value: not expected, do not retry
068		N	N	reserved value: not expected, do not retry
069	Requested facility not implemented	N	N	Configuration error: wrong DN, error returned by non-soft PVC user, Persistent error: not supported by transit switch
070	Only restricted digital information bearer capability is available	N	N	Configuration error: wrong DN, error returned by non-soft PVC user
071		N	N	reserved value: not expected, do not retry
072		N	N	reserved value: not expected, do not retry
073	Unsupported combination of traffic parameters	N	N	Configuration error: not supported traffic parameters, Persistent error: not supported by transit switch
074		N	N	reserved value: not expected, do not retry
075		N	N	reserved value: not expected, do not retry
076		N	N	reserved value: not expected, do not retry
077		N	N	reserved value: not expected, do not retry
078		N	N	reserved value: not expected, do not retry
079	Service or option not implemented, unspecified	N	N	Configuration error: wrong DN, error returned by non-soft PVC user Persistent error: not supported by transit switch
080		Y	Y	reserved value: not expected, retry anyway
081	Invalid call reference value	Y	Y	Temporary error
082	Identified channel does not exist	Y	Y	Temporary error
083	A suspended call exits, but this call identity does not	Y	Y	Temporary error
084	Call identity in use	Y	Y	Temporary error
085	No call suspended	Y	Y	Temporary error
086	Call having the requested call identity has been cleared	Y	Y	Temporary error

Table II.1/Q.2767.1 – Retry decision on cause value *(continued)*

Value No.	Cause	Retry acti-vation (Y/N)	Retry Re-establ. (Y/N)	Remarks
087	User not member of CUG	N	N	Configuration error: default CUG should allow soft PVC
088	Incompatible destination	N	N	Configuration error: wrong DN, error returned by non-soft PVC user
089		Y	Y	reserved value: not expected, retry anyway
090	Non-existent CUG	N	N	Configuration error: default CUG should allow soft PVC
091	Invalid transit network selection	N	N	Configuration error: wrong destination DN
092		Y	Y	reserved value: not expected, retry anyway
093	AAL parameters cannot be supported	N	N	Configuration error: wrong DN or CES parameter
094		Y	Y	reserved value: not expected, retry anyway
095	Invalid message unspecified	Y	Y	Temporary error
096	Mandatory Information element is missing	Y	Y	Temporary error
097	Message type non-existent or not implemented	N	Y	Temporary error, Incompatible transit switch, Configuration error: non-soft PVC B-side
098	Message not compatible with call state or message type non-existent or not implemented	N	Y	Temporary error, Configuration error: non-soft PVC B-side
099	Information element/parameter non-existent or not implemented	N	Y	Temporary error, Incompatible transit switch, Configuration error: non-soft PVC B-side
100	Invalid information element contents	Y	Y	Temporary error
101	Message not compatible with call state	Y	Y	Temporary error
102	Recovery on timer expiry	Y	Y	Temporary error
103	Parameter non-existent or not implemented, passed on	Y	Y	Not expected
104		Y	Y	reserved value: not expected, retry anyway
105		Y	Y	reserved value: not expected, retry anyway
106		Y	Y	reserved value: not expected, retry anyway
107		Y	Y	reserved value: not expected, retry anyway

Table II.1/Q.2767.1 – Retry decision on cause value *(concluded)*

Value No.	Cause	Retry acti-vation (Y/N)	Retry Re-establ. (Y/N)	Remarks
108		Y	Y	reserved value: not expected, retry anyway
109		Y	Y	reserved value: not expected, retry anyway
110	Message with unrecognized parameter, discarded	Y	Y	Not expected
111	Protocol error, unspecified	Y	Y	Temporary error
112		Y	Y	reserved value: not expected, retry anyway
113		Y	Y	reserved value: not expected, retry anyway
114		Y	Y	reserved value: not expected, retry anyway
115		Y	Y	reserved value: not expected, retry anyway
116		Y	Y	reserved value: not expected, retry anyway
117		Y	Y	reserved value: not expected, retry anyway
118		Y	Y	reserved value: not expected, retry anyway
119		Y	Y	reserved value: not expected, retry anyway
120		Y	Y	reserved value: not expected, retry anyway
121		Y	Y	reserved value: not expected, retry anyway
122		Y	Y	reserved value: not expected, retry anyway
123		Y	Y	reserved value: not expected, retry anyway
124		Y	Y	reserved value: not expected, retry anyway
125		Y	Y	reserved value: not expected, retry anyway
126		Y	Y	reserved value: not expected, retry anyway
127	Interworking, unspecified	Y	Y	unknown problem ...

ITU-T RECOMMENDATIONS SERIES

Series A	Organization of the work of the 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
Series Z	Programming languages