EUROPEAN TELECOMMUNICATION STANDARD

ETS 300 172

November 1995

Third Edition

Source: ETSI TC-ECMA

Reference: RE/ECMA-00117

ICS: 35.020

Key words: PISN, PSS1, PTN, QSIG

Private Integrated Services Network (PISN); Inter-exchange signalling protocol; Circuit-mode basic services

[ISO/IEC 11572 (1994) modified]

ETSI

European Telecommunications Standards Institute

ETSI Secretariat

Postal address: F-06921 Sophia Antipolis CEDEX - FRANCE
Office address: 650 Route des Lucioles - Sophia Antipolis - Valbonne - FRANCE
X.400: c=fr, a=atlas, p=etsi, s=secretariat - **Internet:** secretariat@etsi.fr

Tel.: +33 92 94 42 00 - Fax: +33 93 65 47 16

Foreword

This third edition European Telecommunication Standard (ETS) was produced by the Standardizing Information and Communication Systems (ECMA) on behalf of its members and those of the European Telecommunications Standards Institute (ETSI).

The protocol defined in this ETS is the basis for the QSIG protocol for signalling at the Q reference point between Private Integrated services Network eXchanges (PINX). The QSIG protocol is known as "Private integrated Signalling System no. 1" (PSS1) in International Standards.

Whilst this particular ETS defines signalling for the support of circuit-mode bearer services, other ETSs specify other aspects of the QSIG protocol, e.g. generic procedures for the support of supplementary services, and individual supplementary services.

The previous (second) edition of this ETS contained a "standalone" definition of the protocol. This edition endorses an International Standard, ISO/IEC 11572, published since the publication of the second edition of this ETS.

Transposition dates	
Date of adoption of this ETS:	30 November 1995
Date of latest announcement of this ETS (doa):	28 February 1996
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	31 August 1996
Date of withdrawal of any conflicting National Standard (dow):	31 August 1996

Endorsement notice

The text of International Standard ISO/IEC 11572 (1994) was approved by ETSI as an ETS with agreed modifications as given below.

NOTE: New or modified text is indicated using sidebars. In addition, underlining and/or strike-out are used to highlight detailed modifications where necessary.

Clause 1

Replace the text of clause 1 by:

This European Telecommunication Standard (ETS) defines the Layer 3 protocol for signalling for the support of circuit-mode bearer services (used either on their own or in support of teleservices) at the Q reference point between Private Integrated services Network eXchanges (PINX) connected together within a Private Integrated Services Network (PISN). The Q reference point is defined in ETS 300 475-1 [14].

Service specifications are produced in three stages and according to the method specified in ETS 300 387 [13]. The definition of signalling protocols is stage 3 of the method. Stage 1 and stage 2 specifications of the basic circuit-mode bearer services are to be found in ETS 300 171 [10]. The protocol defined in this ETS satisfies the requirements identified by the stage 1 and stage 2 specifications in ETS 300 171 [10].

Annexes ZA - ZD are an integral part of this ETS.

Clause 2

After clause 2, add the following new clause:

2bis Conformance

In order to conform to this ETS, a PINX shall satisfy the requirements identified in the Protocol Implementation Conformance Statement (PICS) proforma in annex A.

Clause 3

Replace the first paragraph by:

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

Insert the following normative references at the end of clause 3:

[9] ETS 300 102-1 (1990): "Integrated Services Digital Network (ISDN); User-network interface layer 3 Specifications for basic call control".

[10] ETS 300 171 (1992): "Private Telecommunication Network (PTN); Specification, functional models and information flows Control aspects of circuit-mode basic services".

[11] ETS 300 173 (1992): "Private Telecommunication Network (PTN); Specification, functional models and information flows Identification supplementary services".

[12] ETS 300 189 (1992): "Private Telecommunication Network (PTN); Addressing".

[13] ETS 300 387 (1994): "Private Telecommunication Network (PTN); Method for the specification of basic and supplementary services".

[14] ETS 300 475-1 (1995): "Private Integrated Services Network (PISN); Reference configuration Part 1: Reference configuration for PISN eXchanges (PINXs)".

Throughout the text of ISO/IEC 11572

Throughout the text of ISO/IEC 11572, replace references as shown in the table below:

Reference in ISO/IEC 11572	Modified reference
CCITT Q.931 (note)	ETS 300 102-1 [9]
CCITT Recommendation Q.931	ETS 300 102-1 [9]
ISO/IEC 11571	ETS 300 189 [12]
ISO/IEC 11572 or International Standard ISO/IEC 11572	ETS 300 172
DIS 11574 or ISO/IEC 11574	ETS 300 171 [10]
DIS 11579 or ISO/IEC 11579	ETS 300 475-1 [14]
NOTE: This replacement should be made through out the text except in table 20, where the term "CCITT Q.931" is used to describe the protocol discriminator coding.	

Throughout the text of ISO/IEC 11572

Throughout the text of ISO/IEC 11572, replace the term "International Standard" by "ETS".

Subclause 4.10

Replace the text "clauses 9.3 and 10" by "clauses 9.3 and 10, and annex ZA".

Subclause 4.12

Insert the following new subclause after subclause 4.12:

4.13 Signalling Carriage Mechanism (SCM)

The infrastructure that transports messages between Protocol Control entities in two interconnected PINXs.

Subclause 9.1.1

Replace the text "general procedures in 9.2 and 9.3" by "general procedures in subclauses 9.2 and 9.3 and annex ZA".

Subclause 9.2.7.1

Replace the text "(refer to Table 22" by "(refer to Tables 22 and 34".

Subclause 10.5.1

In item (c), replace the text "Calling/Connected Line Identification Restriction" by "Calling/Connected Line Identification Restriction (see ETS 300 173 [11])".

Subclause 10.6.4

In the second paragraph, replace the text "Calling/Connected Line Identification Restriction" by "Calling/Connected Line Identification Restriction (see ETS 300 173 [11])".

Subclause 10.7.6

In the last paragraph of 10.7.6, replace the words "no connected number or subaddress information other than the presentation indicator shall be presented to the other network." by "presentation of the number to the other network is outside the scope of this ETS, but will depend on such factors as the other network's commitment to honour the restriction.".

Clause 12, table 4

Replace the text of note 5 (beginning "Timers T301 ....") to table 4 by:

"NOTE 5: The value of this timer is implementation dependent and shall be equal to, or greater than, 30 seconds. In the case of operation of certain call handling supplementary services in a PISN, the receipt of an ALERTING or CONNECT message may be delayed significantly beyond that expected for a normal call. In order to ensure that unnecessary failure of these services can be avoided, it is recommended that T310 be given a value of at least 110 seconds.".

Clause 14

Replace the second paragraph by:

Whenever a message is sent, according to the procedures of clauses 9, 10 and 11, it shall be coded as specified in this clause, except where the message is segmented according to the procedures of annex ZA, in which case each message segment shall be coded as specified in that annex.

Subclause 14.4, table 21

Modify table 21 (continued) as follows:

Table 21: Message type (continued)

Bits 8 7 6 5 4 3 2 1	
0 1 1 0 1	RELEASE
1 1 0 1 0	RELEASE COMPLETE
0 0 1 1 0	RESTART
0 1 1 1 0	RESTART ACKNOWLEDGE
0 1 1	*Miscellaneous messages*
0 0 0 0 0	SEGMENT (note 2)
1 1 0 1 1	INFORMATION
1 1 1 0 1	STATUS
1 0 1 0 1	STATUS ENQUIRY

NOTE 1: The handling of national/private messages is outside the scope of this ETS (see annex D).
NOTE 2: This message type is only used in conjunction with the message segmentation and re-assembly procedures defined in annex ZA.

Subclause 14.5.1, table 22

Modify table 22 by inserting a new row before the row for bearer capability, as follows:

0 0 0 0 0 0 0 0	Segmented message	annex ZA	note 1
0 0 0 0 0 1 0 0	Bearer capability	14.5.5	11

Subclause 14.5.2

Replace the 8th paragraph by:

Codeset 4 is used for ISO defined information elements. Codeset 5 is used by ETSI for information elements that are defined in addition to those defined by ITU-T or ISO. The rules for handling information elements of codeset 0 apply to codesets 4 and 5 too. See also subclause 14.6.

Subclause 14.5.3, table 23

Modify table 23 as follows:

Table 23: Locking/non-locking shift element

Codeset identification		
Bits		
3 2 1		
0 0 0	Codeset 0:	CCITT Q.931 information elements (initially active codeset)
1 0 0	Codeset 4:	Information elements defined by ISO
1 0 1	Codeset 5:	Information elements defined by ETSI
1 1 0	Codeset 6:	Information elements specific to the local network (public or private)
1 1 1	Codeset 7:	User-specific information elements
All other values are reserved (note 1)		
NOTE 1: The handling of national/private information elements is outside the scope of this ETS (see annex D).		

Subclause 14.5.5, table 24

Modify the coding of the Information transfer capability (octet 3) in table 24 as follows:

Information transfer capability (octet 3)	
Bits	
5 4 3 2 1	
0 0 0 0 0	Speech
0 1 0 0 0	Unrestricted digital information
0 1 0 0 1	Restricted digital information (applicable only in interworking situations)
1 0 0 0 0	3,1 kHz audio
1 0 0 0 1	Unrestricted digital information with tones / announcements
All other values are reserved.	

Subclauses 14.5.8 and 14.5.10

In subclauses 14.5.8 and 14.5.10:

Add a note at the end of the first paragraph:

NOTE 1: For the definition of subaddress, see ETS 300 189 [12].

Renumber the existing note to be NOTE 2.

Subclause 14.5.12

Replace the text of NOTE 2 by:

NOTE 2: Channel number shall be used unless there is a bilateral agreement to use channel map.

Subclause 14.5.14

In subclause 14.5.14, add a note at the end of the first paragraph:

NOTE 1: For the definition of subaddress, see ETS 300 189 [12].

Renumber the existing note to be NOTE 2.

Subclause 14.5.17, table 32

In table 32, following the first occurrence (i.e., in relation to the codepoints for the Coding standard, octet 3) of the words "All other values are reserved", add the words "(note 5)".

In table 32, following the words "Progress description (octet 4)", add (as underlined text) the words "NOTE 5".

In table 32, following the third occurrence (i.e., in relation to the codepoints for the Progress description, octet 4) of the words "All other values are reserved", add the words "(note 5)".

In the notes at the end of table 32, add a new note:

NOTE 5: Additional progress descriptions are specified in annex ZC.

Subclause 14.5.19

Insert the following new subclauses after subclause 14.5.19:

14.6 Information elements of codeset 4

Codeset 4 contains information elements defined by ISO/IEC.

In general the coding rules described in subclause 14.5.1 for codeset 0 apply to codeset 4 also.

Table 34 lists the information element identifiers for information elements of codeset 4 used in this ETS.

Table 34: Information element Identifier coding (Codeset 4)

Coding									Ref.	Length
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**			
1	:	:	:	-	-	-	-	*Single Octet information elements:*		
	0	0	0	-	-	-	-	Reserved		
	0	0	1	-	-	-	-	Shift	14.5.3	1
0	:	:	:	:	:	:	:	*Variable length information elements:*		
	0	1	1	0	0	0	1	Transit counter	annex ZB	3
All other values are reserved.										

14.7 Information elements of codeset 5

Codeset 5 contains information elements defined by ETSI.

In general the coding rules described in subclause 14.5.1 for codeset 0 apply to codeset 5 also.

Table 35 lists the information element identifiers for information elements of codeset 5 used in this ETS.

Table 35: Information element Identifier coding (Codeset 5)

Coding									Ref.	Length
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**			
1	:	:	:	-	-	-	-	*Single Octet information elements:*		
	0	0	0	-	-	-	-	Reserved		
	0	0	1	-	-	-	-	Shift	14.5.3	1
0	:	:	:	:	:	:	:	*Variable length information elements:*		
	0	1	1	0	0	1	0	Party category	annex ZD	3
All other values are reserved.										

Annex A, subclause A.4.1

Insert a new row at the end of the PICS proforma table in subclause A.4.1, as follows:

Z4	Support of the unrestricted digital information with tones / announcements bearer	14.5.5	o		Yes [ ] No [ ]

Annex A (end of)

Insert the following new subclauses at the end of annex A:

A.4.12 Message segmentation / re-assembly procedures

Item	Question/feature	Reference	Status	N/A	Support
K1	Maximum message size generated	ZA.3	m		Size [ ]
K2	Maximum message size received	ZA.3	m		Size [ ]
K3	Is length of signalling carriage mechanism information field < max. generated message size	ZA.3	o		Yes [ ] No [ ]
K4	Is length of signalling carriage mechanism information field < max. received message size	ZA.3	o		Yes [ ] No [ ]
K5	Procedures for messages segmentation	ZA.3.1	c.12		Yes [ ]
K6	Procedures for messages re-assembly	ZA.3.2	c.13	[ ]	Yes [ ]
K7	Message formats and codings for segmented messages and information elements supported	ZA.4, ZA.5	c.14	[ ]	Yes [ ]
K8	Implementation of T314	ZA.6	c.13	[ ]	Yes [ ]

c.12 If K3, then mandatory else, prohibited
c.13 If K4, then mandatory else, not applicable
c.14 If K3 or K4, then mandatory else, not applicable

A.4.13 Transit counter functionality

Item	Question/feature	Reference	Status	N/A	Support
L1	Transit counter functionality	ZB.2	o		Yes [ ] No [ ]
L2	Behaviour as Originating PINX for Transit counter functionality	ZB.2.3.1	c.15	[ ]	Yes [ ]
L3	Behaviour as Incoming Gateway PINX for Transit counter functionality	ZB.2.3.4	c.16	[ ]	Yes [ ]
L4	Behaviour as Transit PINX for Transit counter functionality	ZB.2.3.3	c.17	[ ]	Yes [ ]
L5	Behaviour as Terminating PINX for Transit counter functionality	ZB.2.3.2	c.18	[ ]	Yes [ ]
L6	Behaviour as Outgoing Gateway PINX for Transit counter functionality	ZB.2.3.5	c.19	[ ]	Yes [ ]
L7	Sending of a Transit counter information element in a SETUP message	ZB.2.3	c.20	[ ]	Yes [ ] No [ ]

c.15 If B1 and L1 then mandatory else, not applicable
c.16 If B2 and L1 then mandatory else, not applicable
c.17 If B3 and L1 then mandatory else, not applicable
c.18 If B4 and L1 then mandatory else, not applicable

c.19 If B5 and L1 then mandatory else, not applicable
c.20 If L2 or L3 or L4 then optional else, not applicable

A.4.14 Additional progress descriptions

Item	Question/feature	Reference	Status	N/A	Support
M1	Up to three Progress indicator information elements within the same message	annex ZC	m		Yes [ ]
M2	Additional progress descriptions	annex ZC	m		Yes [ ]

A.4.15 Party category functionality

Item	Question/feature	Reference	Status	N/A	Support
N1	Party category functionality	ZD.2	o		Yes [ ] No [ ]
N2	Behaviour as Originating PINX for Party category functionality	ZD.2.3.1	c.21	[ ]	Yes [ ]
N3	Behaviour as Incoming Gateway PINX for Party category functionality	ZD.2.4.1	c.22	[ ]	Yes [ ]
N4	Behaviour as Transit PINX for Party category functionality	ZD.2.3.3	c.23	[ ]	Yes [ ]
N5	Behaviour as Terminating PINX for Party category functionality	ZD.2.3.2	c.24	[ ]	Yes [ ]
N6	Behaviour as Outgoing Gateway PINX for Party category functionality	ZD.2.4.2	c.25	[ ]	Yes [ ]
N7	Sending of a Party category information element in a SETUP message	ZD.2.3, ZD.2.4	c.26	[ ]	Yes [ ] No [ ]
N8	Sending of a Party category information element in an ALERTING message	ZD.2.3, ZD.2.4	c.27	[ ]	Yes [ ] No [ ]
N9	Sending of a Party category information element in a CONNECT message	ZD.2.3, ZD.2.4	c.27	[ ]	Yes [ ] No [ ]

c.21 If B1 and N1 then mandatory else, not applicable
c.22 If B2 and N1 then mandatory else, not applicable
c.23 If B3 and N1 then mandatory else, not applicable
c.24 If B4 and N1 then mandatory else, not applicable
c.25 If B5 and N1 then mandatory else, not applicable
c.26 If N2 or N3 or N4 then optional else, not applicable
c.27 If N4 or N5 or N6 then optional else, not applicable

Annex G

Add the following bibliographic reference to annex G:

[3bis] CCITT Recommendation Q.931 (1988): "ISDN user-network interface layer 3 specification for basic call control" (Blue Book, Volume VI, Fascicle VI.11).

Add the following new annex ZA:

Annex ZA (normative): Message segmentation / re-assembly procedures

ZA.1 Message segmentation and re-assembly functions

Message segmentation and re-assembly functions shall be employed where the size of a message exceeds the maximum size of the SCM information field.

The architectural relationship of segmentation and re-assembly functions to other Protocol Control functions is shown in figure ZA.1.

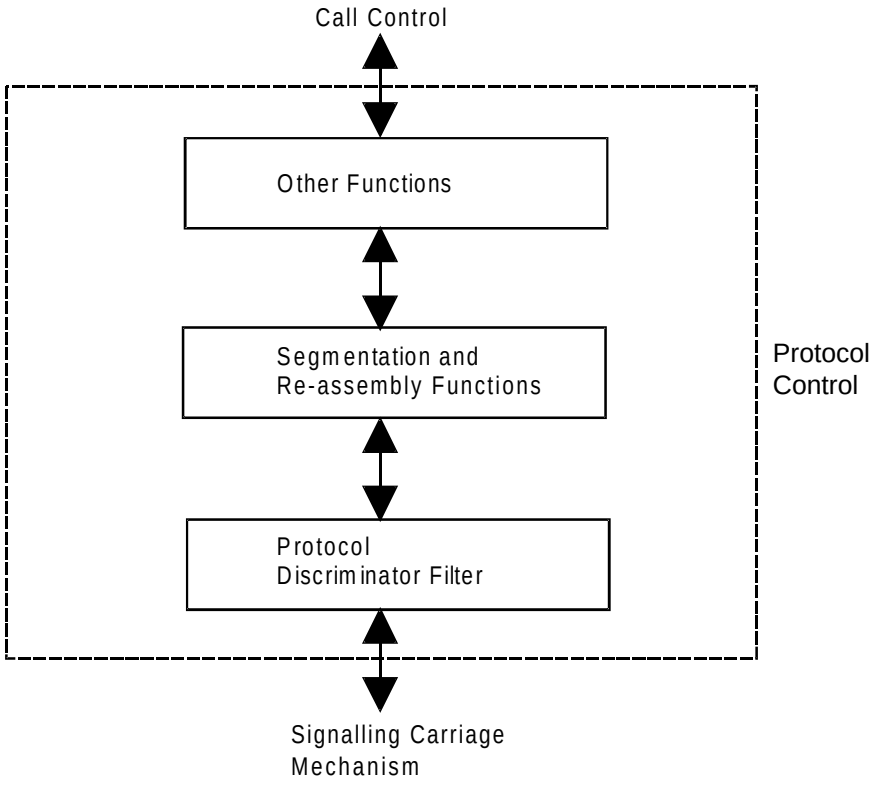

Figure ZA.1: Logical architecture of Protocol Control showing segmentation and re-assembly functions

Segmentation and re-assembly, where provided, effectively constitute a lower sublayer of Protocol Control.

NOTE: The only function of Protocol Control below the segmentation and re-assembly functions is protocol discriminator filtering. This function filters out messages containing a protocol discriminator that does not match the one specified in this ETS.

The primitives across the boundary between segmentation and re-assembly functions and other functions are the same as those between the Signalling Carriage Mechanism and Protocol Control (see subclause 6.3). The segmentation functions act upon DL-DATA-REQUEST primitives by converting, where necessary, a single primitive into two or more primitives before passing to the Signalling Carriage Mechanism. The re-assembly functions act upon DL-DATA-INDICATION primitives from the Signalling Carriage Mechanism by converting, where necessary, two or more primitives into a single primitive for passing up to the other functions of Protocol Control. Other primitives to and from the Signalling Carriage Mechanism are not affected by the segmentation and re-assembly functions.

ZA.2 States for message segmentation / re-assembly

Message segmentation and re-assembly procedures are each specified in terms of a state machine. Message segmentation uses a single state, Null (0). Message re-assembly uses two states, as listed below.

ZA.2.1 Null (0)

No message is being reassembled.

ZA.2.2 Receiving segmented message (1)

One or more segments of a segmented message have been received and one or more further segments are awaited.

ZA.3 Segmentation and re-assembly procedures

This clause specifies message segmentation and re-assembly procedures for messages the length of which exceeds the maximum size of the Signalling Carriage Mechanism information field. The Signalling Carriage Mechanism information field size is dependent on the PINX interconnection scenario.

A PINX shall conform to the segmentation procedures specified in subclause ZA.3.1 if, for a given PINX interconnection scenario supported by the PINX, it is capable of transmitting a message that exceeds the maximum size of the Signalling Carriage Mechanism information field for that scenario. Segmentation procedures shall not be applied to messages that do not exceed the maximum size of the Signalling Carriage Mechanism information field.

A PINX that claims conformance to this ETS shall declare the maximum size of message that it is able to receive. The declared maximum size shall not be less than 260 octets. If, for a given PINX interconnection scenario supported by the PINX, the maximum size of Signalling Carriage Mechanism information field is less than the declared maximum size of message the PINX can receive, the PINX shall conform to the re-assembly procedures specified in subclause ZA.3.2.

NOTE: If a segmented message is received by a PINX that does not support re-assembly procedures, the procedures specified in subclause 9.2.4 for message type errors will apply to each received segment.

ZA.3.1 Procedures for segmentation

The following rules apply when a message for transmission exceeds the maximum size of the SCM information field:

a) The maximum number of message segments is 8. If a message is too long to be segmented, the action taken shall be an implementation option.

b) The first message segment shall begin with the Protocol discriminator information element immediately followed by the Call reference information element, the SEGMENT message type, the Segmented message information element, and octets starting with the first octet following the message type of the message being segmented, subject to the maximum length of the segment not exceeding the maximum size of the SCM information field.

c) Each subsequent message segment shall begin with the Protocol discriminator information element, immediately followed by the Call reference information element, the SEGMENT message type, the Segmented message information element, and one or more octets of the message being segmented, starting with the first octet following the last octet transmitted in the previous segment and subject to the maximum length of the segment not exceeding the maximum size of the SCM information field.

d) The first segment indicator field of the Segmented message information element shall be set to ONE (the first segment of a segmented message) in the first segment of a segmented message and set to ZERO (subsequent segment to the first segment) in each subsequent segment of that message.

e) The number of segments remaining field of the Segmented message information element shall indicate how many more segments are to be sent.

f) The segmented message type field of the Segmented message information element shall indicate the message type of the original message.

g) Once the first segment has been transmitted on a particular SCM connection, then all remaining segments of that message shall be sent (in order) before any other message (segmented or not) for any other call reference is sent on that SCM connection. Only failure conditions (e.g., SCM failure) shall cause the transmission of a segmented message to be aborted.

h) The octet order of the segmented message shall be preserved regardless of segment boundary.

ZA.3.2 Procedures for re-assembly

The following rules apply to the receipt and re-assembly of segmented messages:

a) A re-assembly function, on receiving a message of type SEGMENT containing the Segmented message information element as the first information element after the message type, shall treat that message as a segment.

b) A re-assembly function in the Null state, on receiving a segment in which the first segment indicator field of the Segmented message information element is set to ONE (first segment of segmented message) and the number of segments remaining field of the Segmented message information element is set to a value greater than 0 and not exceeding 7, shall enter the Receiving segmented message state and save the segment contents. Timer T314 shall be initialised. Timer T314 is used to prevent the re-assembly function waiting indefinitely to receive the next message segment.

c) A re-assembly function in the Receiving segmented message state, on receiving a segment in which the call reference is equal to the call reference of the first segment received, the first segment indicator field of the Segmented message information element is set to ZERO (subsequent segment to first segment), the number of segments remaining field of the Segmented message information element is set to a value one less than the value in the previously received segment, and the segmented message type field has a value equal to the value of that field in the first segment received, shall treat the segment as a valid next segment.

d) A re-assembly function in the Receiving segmented message state, on receiving a valid next segment in which the number of segments remaining field has a value greater than zero, shall save the segment contents along with the saved contents of the previous segment or segments, restart timer T314, and remain in the Receiving segmented message state.

e) A re-assembly function in the Receiving segmented message state, on receiving a valid next segment in which the number of segments remaining field has a value equal to zero, shall stop timer T314, deliver the accumulated segments, including the last segment, as a single message for further Protocol Control processing, and enter the Null state. The message delivered shall have a call reference equal to that in each received segment and a message type equal to that in the segmented message type field of the Segmented message information element of each received segment. Octets following the Segmented message information element in each received segment shall be included in the delivered message in the order received.

f) A re-assembly function in the Null state shall deliver for further Protocol Control processing any received message of type other than SEGMENT or that is too short to contain a message type.

g) A re-assembly function in the Null state shall discard any received message of type SEGMENT that is not a valid first segment. Any other action taken shall be an implementation option. This applies to the following:

- Messages of type SEGMENT without a valid Segmented message information element following the message type;

- Segments in which the first segment indicator field of the Segmented message information element is set to ZERO (subsequent segment to first segment);

- Segments in which the number of segments remaining field of the Segmented message information element has a value 0 or a value exceeding 7.

h) A re-assembly function in the Receiving segmented message state shall discard any saved segments, stop timer T314 and enter the Null state on receipt of any message which is not a valid next segment. This applies to the following:

- Messages with a different call reference from that in the first received segment;
- Messages of type other than SEGMENT;
- Messages of type SEGMENT without a valid Segmented message information element following the message type;
- Segments in which the first segment indicator field of the Segmented message information element is set to ONE (first segment of segmented message);
- Segments in which the number of segments remaining field of the Segmented message information element has a value which is not one less than the value in the previously received segment;
- Segments in which the segmented message type field of the Segmented message information element has a value which is not equal to the value in the first received segment.

In the case of a message with a different call reference from that in the first received segment or a message with a message type other than SEGMENT, the received message shall be processed as if it had been received while in the Null state. In all other cases the received message shall be discarded. Any other action taken shall be an implementation option.

i) On expiry of timer T314, the re-assembly function shall discard any saved segments and enter the Null state. Any other action taken shall be an implementation option.

j) If a DL-RELEASE-INDICATION or DL-ESTABLISH-INDICATION is received while the re-assembly function is in the Receiving segmented message state, the re-assembly function shall discard any saved segments, stop timer T314, and enter the Null state. The DL-RELEASE-INDICATION or DL-ESTABLISH-INDICATION shall be delivered for further Protocol Control processing.

ZA.3.3 SDL for segmentation and re-assembly (informative)

In the figures that follow, input signals from the left (except those indicating timer expiry) and output signals to the left are from and to the Other Functions of Protocol Control, and input signals from the right and output signals to the right are from and to the Signalling Carriage Mechanism, via the Protocol Discriminator Filter.

Figure ZA.2 shows the procedures for message segmentation in SDL form. The SDL process forms part of the Segmentation and Re-Assembly Functions of Protocol Control (see clause ZA.1) and intercepts all primitives sent from Other Functions of Protocol Control towards the Signalling Carriage Mechanism.

Figure ZA.3, show the procedures for message re-assembly in SDL form. The SDL process forms part of the Segmentation and Re-assembly Functions of Protocol Control (see clause ZA.1) and intercepts all primitives received from the Signalling Carriage Mechanism via the Protocol Discriminator Filter.

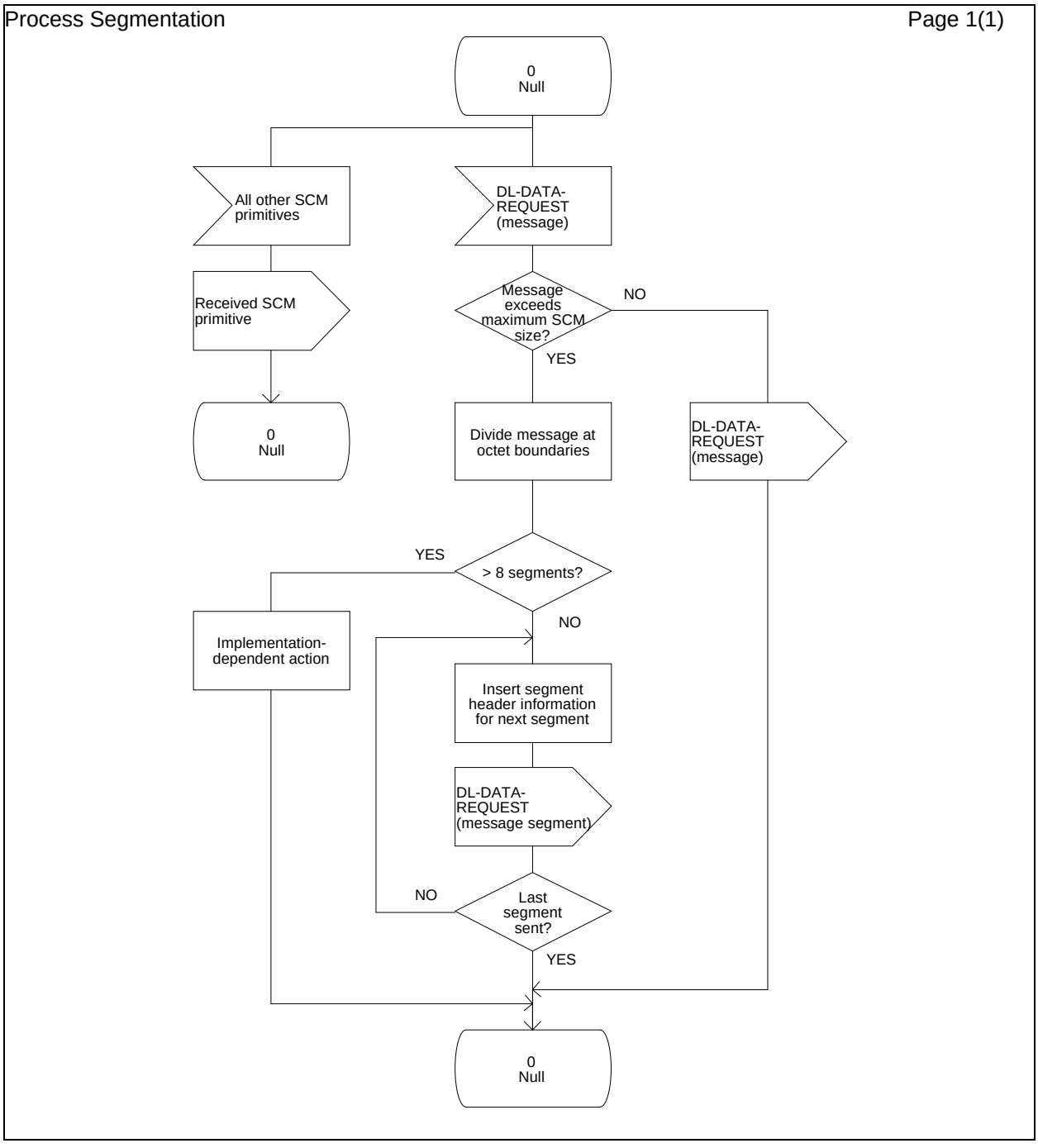

Figure ZA.2: Segmentation Process SDL

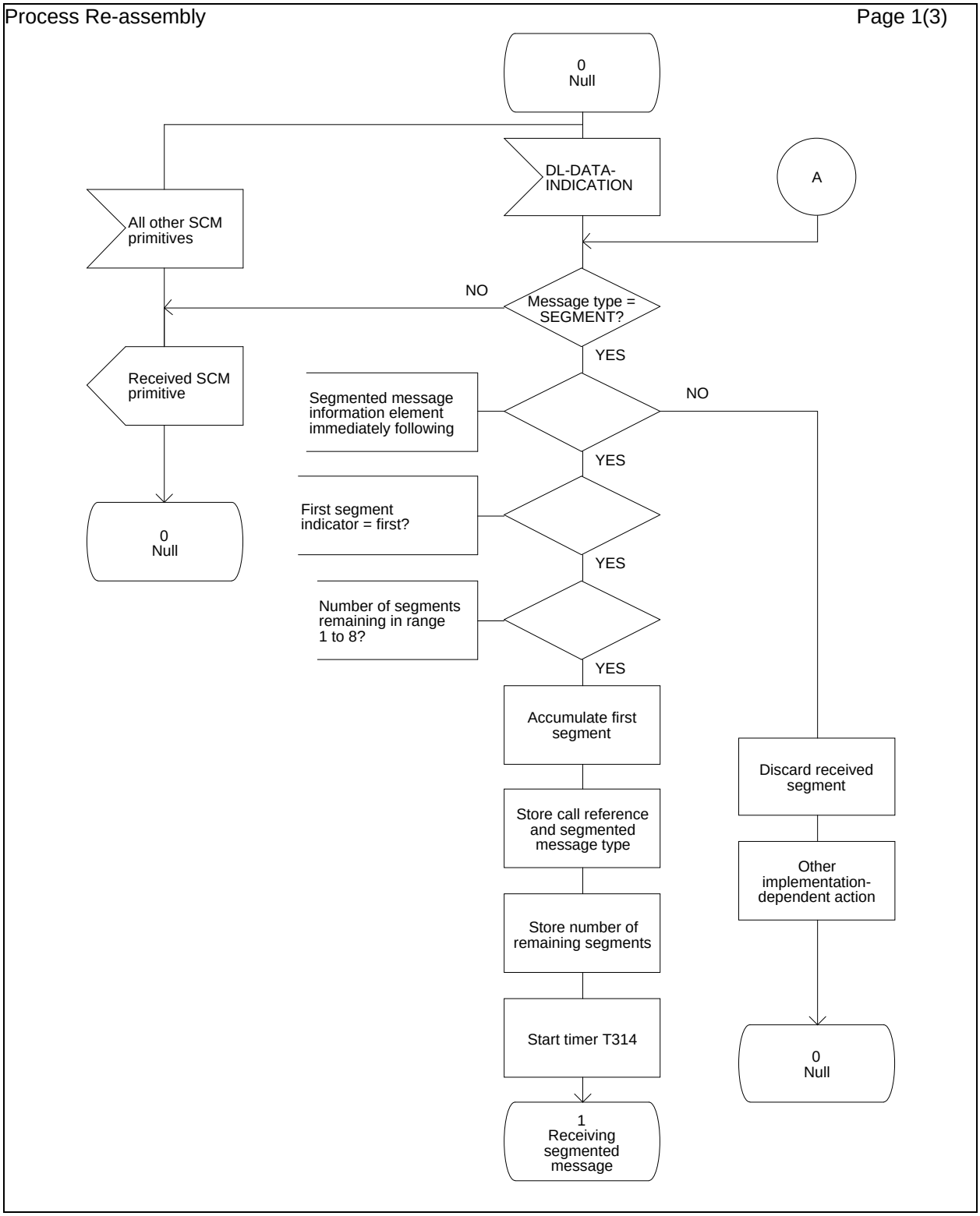

Figure ZA.3 (page 1 of 3): Re-assembly Process SDL

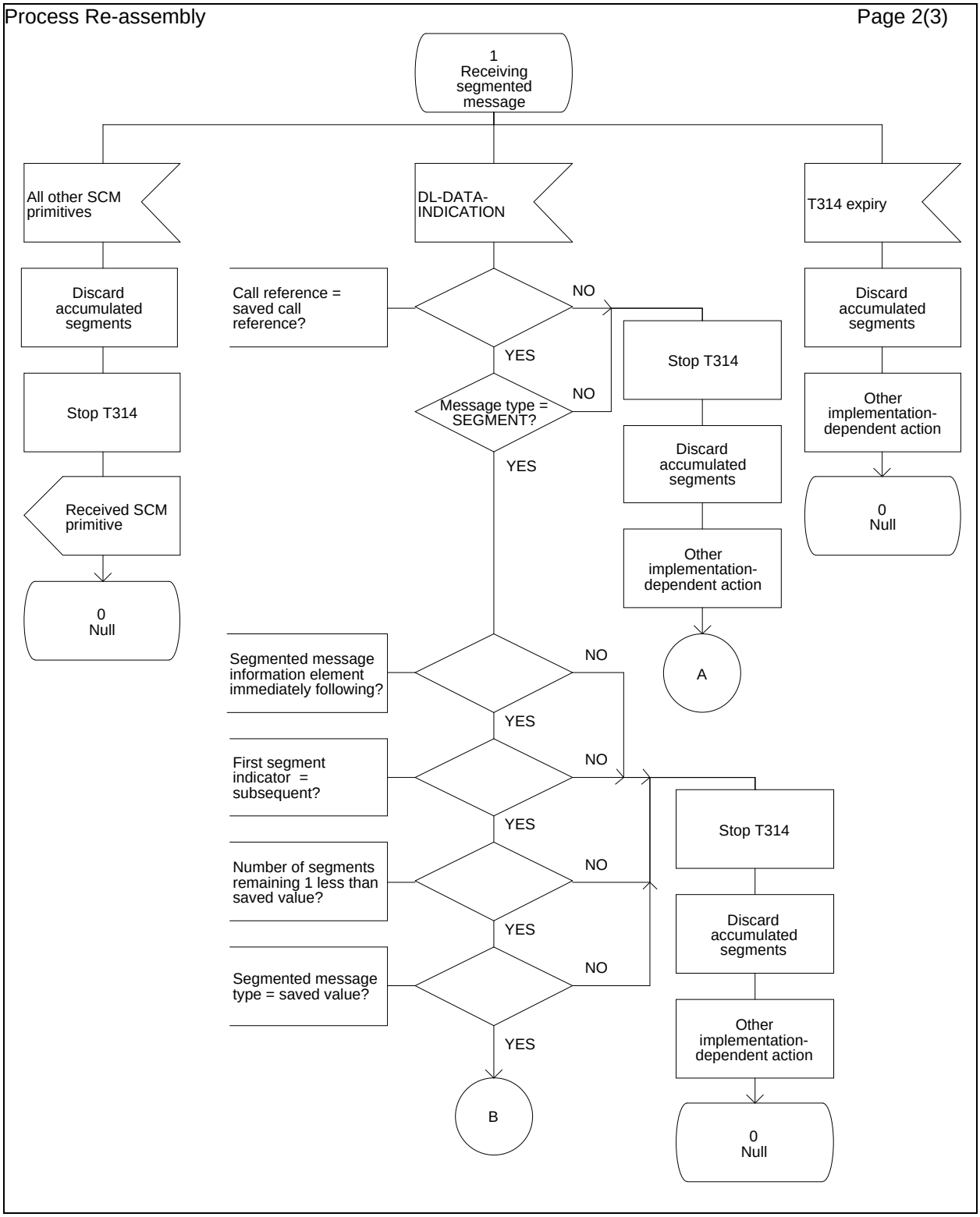

Figure ZA.3 (page 2 of 3): Re-assembly Process SDL

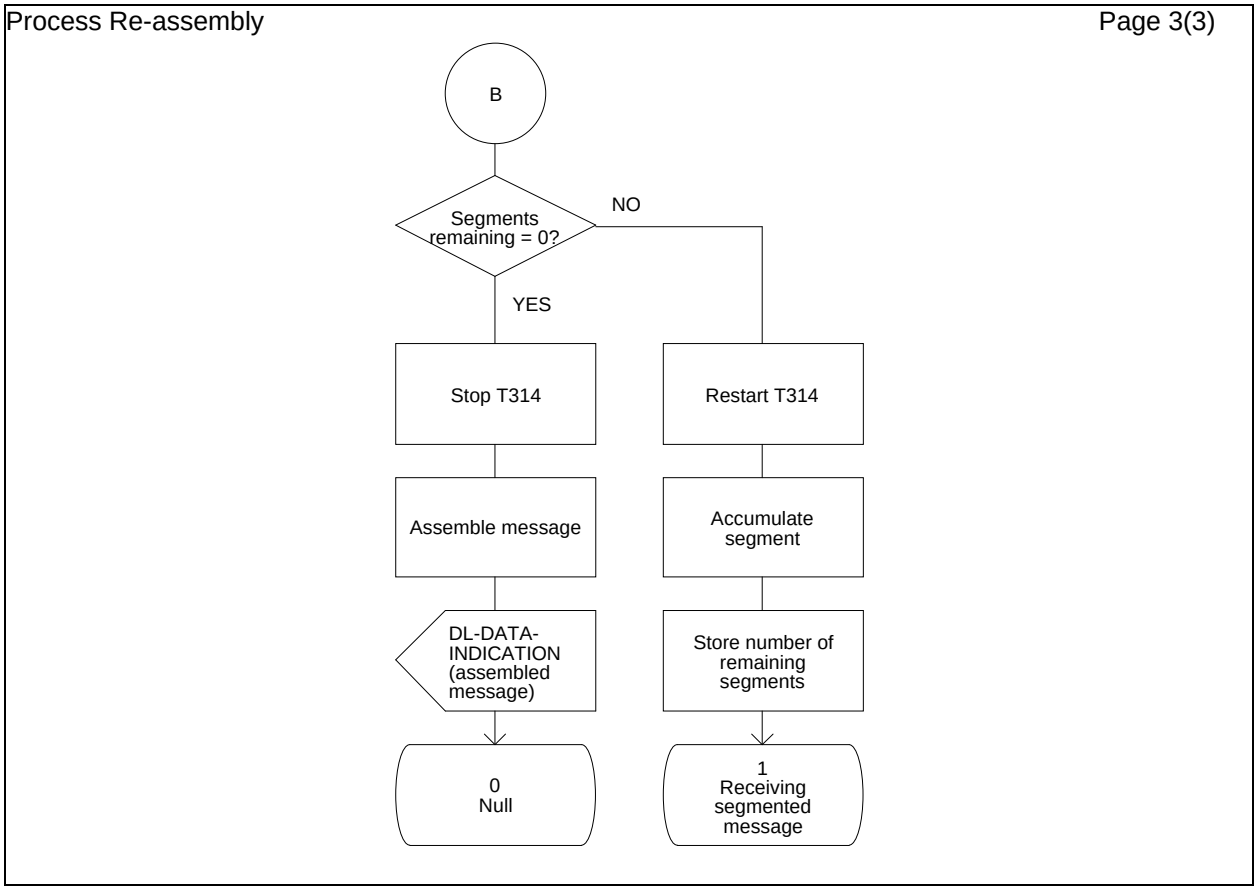

Figure ZA.3 (page 3 of 3): Re-assembly Process SDL

ZA.4 Message definition and content

The SEGMENT message may be sent by either side whenever it is necessary to send a message, the length of which exceeds the maximum size of the Signalling Carriage Mechanism information field. The SEGMENT message has content as shown in table ZA.1.

Table ZA.1: SEGMENT message content

Message type: SEGMENT
Direction: both

Information element	Reference	Type	Length
Protocol discriminator	14.2	M	1
Call reference	14.3	M	3
Message Type	14.4, ZA.5.1	M	1
Segmented message	ZA.5	M	4
Octets from the message being segmented	ZA.2	M	1-*

ZA.5 Information elements

ZA.5.1 Message type

The Message type information element (see subclause 14.4) shall have the format shown in figure 8 and shall be coded as shown in table ZA.2.

Table ZA.2: Coding for SEGMENT message type

Bits								
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
0	1	1						*Miscellaneous messages*
			0	0	0	0	0	SEGMENT

ZA.5.2 Segmented message

The Segmented message information element is a variable length information element in codeset 0 with the format shown in figure ZA.4 and coded as shown in table ZA.3.

NOTE: The general format and coding of variable length information elements is defined in subclause 14.5.1.

8	7	6	5	4	3	2	1	
Segmented message								
0	0	0	0	0	0	0	0	Octet 1
Information element identifier								
Length of segmented message contents								Octet 2
1st seg ind.	Number of segments remaining							Octet 3
0	Segmented message type							Octet 4

Figure ZA.4: Segmented message information element

Table ZA.3: Segmented message information element

First segment indicator (octet 3)

Bit	
8	
0	Subsequent segment to first segment
1	First segment of segmented message

Number of segments remaining (octet 3)
Binary number indicating the number of remaining segments within the message to be sent.

Segmented message type (octet 4)
Type of message being segmented, coded according to 14.4. This octet shall not contain the SEGMENT message type (binary value "01100000"). Bit 8 is reserved for possible future use as an extension bit.

ZA.6 Protocol timer definition

There are no timer definitions for the segmentation procedures. The protocol timer definition in table ZA.4 shall apply for the re-assembly procedures.

Table ZA.4: Protocol timer definition for re-assembly procedures

Timer number	Timer value	Call state	Cause for start	Normally terminated	Action to be taken when timer expires	Status
T314	Min. 4 s Max. 6 s	Receiving segmented message	Message segment received	Last message segment received	Discard message	Mandatory if the associated procedures are implemented

Add the following new annex ZB:

Annex ZB (normative): Transit counter functionality

ZB.1 Introduction

This annex specifies the signalling protocol for the support of Transit counter functionality at the Q reference point. Transit counter functionality is defined in ETS 300 171 [10].

It is optional to support the procedures specified in this annex.

ZB.2 Signalling protocol for the support of transit counter

ZB.2.1 Transit counter description

Transit counter functionality limits the number of Transit PINXs that a call setup request may be routed through e.g., to protect the network against indefinite looping.

Use of the transit counter function is a network option. The criteria for determining:

- when it should be used;
- the number of PINXs through which a call may be routed; and,
- the means by which the feature is activated or deactivated

are network dependant and outside the scope of this ETS.

ZB.2.2 Transit counter coding requirements

ZB.2.2.1 Information elements

The Transit counter information element is a variable length category 1 (see subclause 10.4.11.2) codeset 4 information element with the format shown in figure ZB.1 and coded as shown in table ZB.1.

NOTE: The general format and coding of variable length information elements is defined in subclause 14.5.1.

8	7	6	5	4	3	2	1	
Transit counter								
0	0	1	1	0	0	0	1	Octet 1
Information element identifier								
Length of transit counter contents								Octet 2
1	0	0	Transit count					Octet 3
ext	Reserved		(binary value)					

Figure ZB.1: Transit counter information element

Table ZB.1: Transit counter information element

Transit count (octet 3) A binary value (in the range 0 - 31) that indicates the number of Transit PINXs through which the SETUP request has already passed. The maximum number of Transit PINXs through which a SETUP request may pass is a network dependent value.

ZB.2.2.2 Messages

If used, the Transit counter information element shall be conveyed in the SETUP message sent by the outgoing side to the incoming side to initiate call establishment.

NOTE: Because this information element is a codeset 4 information element, one of the shift information elements (see subclauses 14.5.3 and 14.5.4) will precede the Transit counter information element in the SETUP message.

ZB.2.3 Signalling procedures

The signalling protocol for Transit counter functionality operates in association with the protocol for basic circuit-switched call control, as specified in clause 10 of this ETS.

ZB.2.3.1 Actions at the Originating PINX

An Originating PINX initiating call establishment may include a Transit counter information element in the SETUP message sent across an inter-PINX link. The value of the transit count field shall be set to zero.

ZB.2.3.2 Actions at the Terminating PINX

A Terminating PINX shall ignore the Transit counter information element if it is contained in any received SETUP message.

ZB.2.3.3 Actions at a Transit PINX

ZB.2.3.3.1 Normal procedures

On receipt of a SETUP message from the Preceding PINX (see subclause 10.4.1), the call request shall be processed.

If the received SETUP message contains a Transit counter information element in which the transit count field has a value that is less than the acceptable (network dependent) limit, that information element shall be included in the SETUP message sent to the Subsequent PINX. The value of the transit count field in the outgoing Transit counter information element shall be set to one greater than the value received.

If the received SETUP message does not contain a Transit counter information element, the Transit PINX may include a Transit counter information element in the SETUP message sent to the Subsequent PINX. The value of the transit count field in this element shall be set to a value not less than 1.

ZB.2.3.3.2 Exceptional procedures

If the SETUP message received from the Preceding PINX contains a Transit counter information element in which the transit count field has a value that is greater than or equal to the acceptable (network dependent) limit of Transit PINX's through which the call may be routed, and the PINX is unable to become a Terminating or Outgoing Gateway PINX, the call shall be rejected by sending a RELEASE COMPLETE message to the Preceding PINX. The acceptable limit shall not exceed 31.

The Transit PINX shall remain in the TCC_Idle state.

ZB.2.3.4 Actions at an Incoming Gateway PINX

When routeing a call entering the PISN (see subclause 10.7.1) an Incoming Gateway PINX may include a Transit counter information element in the SETUP message sent across the inter-PINX link. The value of the transit count field shall be set to zero.

ZB.2.3.5 Actions at an Outgoing Gateway PINX

An Outgoing Gateway PINX shall ignore the Transit counter information element if it is contained in any received SETUP message.

Add the following new annex ZC:

Annex ZC (normative): Additional progress descriptions

ZC.1 Introduction

The coding of the Progress indicator information element in subclause 14.5.17 defines several progress descriptions for interworking situations. The procedures in clause 10 specify the circumstances when each is used. In particular, progress descriptions are transmitted over an inter-PINX link:

- by an Incoming Gateway PINX for calls entering the PISN from another network; and,

- by an Outgoing Gateway PINX for calls passing from the PISN to another network.

This annex specifies some additional codings (and their use) for the progress description field of the Progress indicator information element. These additional progress descriptions can be used to convey supplementary information about the interworking environment applicable to a particular call.

These additional progress descriptions are defined by the call history service element in ETS 300 171 [10].

It is mandatory to support the progress descriptions and procedures specified in this annex. The requirements specified in this annex are additional to the requirements specified in clause 10 of this ETS.

ZC.2 General requirements

In addition to the progress descriptions listed in subclause 14.5.17, a PINX shall also support the following progress descriptions:

- 16 "interworking with a public network";

- 17 "interworking with a network unable to supply a release signal";

- 18 "interworking with a network unable to supply a release signal before answer";

- 19 "interworking with a network unable to supply a release signal after answer".

A PINX shall be capable of sending ALERTING, CONNECT, PROGRESS and SETUP messages containing up to three Progress indicator information elements, as appropriate to the circumstances of a particular call.

NOTE: More than one Progress indicator information element may be sent in the same message, to indicate different conditions.

A PINX shall also be capable of receiving and acting upon such messages, including in the case of a Transit PINX, passing all Progress indicators received on to the next PINX.

ZC.3 Coding requirements for additional progress descriptions

The Progress indicator information element defined in subclause 14.5.17 is a variable length category 1 (see subclause 10.4.11.2) information element with the format shown in figure 23. Up to three Progress indicator information elements may appear in a single message (to indicate more than one condition).

NOTE: The Progress indicator information element can be conveyed in ALERTING, CONNECT, PROGRESS, and SETUP messages. Subclauses 13.2.1, 13.2.3, 13.2.7 and 13.2.10 respectively define these messages.

The CCITT standardized coding for the information element is shown in table 32. The coding for the Additional progress descriptions is shown in table ZC.1.

Table ZC.1: Coding of Additional progress descriptions

Coding standard (octet 3)
Bits
7 6

0 1 ISO/IEC standard
Other values are defined in table 32

Location (octet 3) Coded as shown in table 32

Progress description (octet 4) (note)

Bits 7 6 5 4 3 2 1	**No**	**Meaning**
0 0 1 0 0 0 0	16	Interworking with a public network
0 0 1 0 0 0 1	17	Interworking with a network unable to supply a release signal
0 0 1 0 0 1 0	18	Interworking with a network unable to supply a release signal before answer
0 0 1 0 0 1 1	19	Interworking with a network unable to supply a release signal after answer

All other values are reserved.

NOTE: Octet 4 shall be coded as shown in this table when the coding standard (octet 3) is "ISO/IEC standard". When the coding standard is "CCITT standardized coding", octet 4 shall be coded as shown in table 32.

ZC.4 Actions at a Transit PINX

A Transit PINX receiving a message containing more than one valid Progress indicator information elements, at least one of which may contain one of the additional progress descriptions described in subclause ZC.3.1, shall act as described in subclause 10.4. That is to say:

- if any of the Progress indicator information elements in the received message contains progress description number 1 "call is not end to end ISDN, further information may be available in band" or number 8 "in band information or appropriate pattern now available" the information channel shall be through connected in the backwards direction if this has not already occurred; and,

- all Progress indicator information elements received shall be passed on to the next PINX.

ZC.5 Actions at an Incoming Gateway PINX

The requirements specified in the following subclauses are in addition to the requirements specified in subclause 10.7.2, thus leading to the possibility of more than one Progress indicator information element being transmitted.

ZC.5.1 Interworking with a public network

If the call has entered the PISN from a public network (ISDN or non-ISDN), a Progress indicator information element shall be sent in the direction of the called user. This Progress indicator information element shall contain progress description 16 "Interworking with a public network".

ZC.5.2 Interworking with a network with limited release capability

If the call has entered the PISN from a network that is unable, or not always able, to supply to the PISN with an indication that the call has been released, a Progress information element shall be sent in the direction of the called user. This Progress indicator information element shall contain one of the following progress descriptions:

- 17 "interworking with a network unable to supply a release signal";

- 18 "interworking with a network unable to supply a release signal before answer"; or,

- 19 "interworking with a network unable to supply a release signal after answer".

Progress description number 18 shall be used if the other network is able to indicate release after it has received an answer signal from the PISN, but is not always able to indicate release prior to receiving an answer signal. In this case, the other network will rely on receiving a release signal from the PISN if answer does not occur within a reasonable time.

Progress description number 19 shall be used if the other network is able to indicate release prior to the receipt of an answer signal from the PISN, but is not always able to indicate release after receiving an answer signal. In this case, the other network will rely on receiving a release signal from the PISN when release is initiated by the called user.

Progress description number 17 shall be used if the other network is not always able to indicate release prior to answer and is not always able to indicate release after answer. In this case, the other network will rely on receiving a release signal from the PISN if answer does not occur within a reasonable time and when release is initiated by the called user.

ZC.6 Actions at an Outgoing Gateway PINX

The requirements specified in the following subclauses are in addition to the requirements specified in subclause 10.8.3, thus leading to the possibility of more than one Progress indicator information element being transmitted.

ZC.6.1 On receipt of the SETUP message

Certain information in the Progress indicator information element(s) contained within a SETUP message received by an Outgoing Gateway PINX may affect the decision of the PINX to route the call to another network. In particular, the Outgoing Gateway PINX shall not establish a call that cannot be released. This can be determined by the presence of a Progress indicator information element containing one of the progress descriptions: 17 "interworking with a network unable to supply a release signal", 18 "interworking with a network unable to supply a release signal before answer", or 19 "interworking with a network unable to supply a release signal after answer", and the Outgoing Gateway PINX's knowledge of the ability of the other network to signal release.

ZC.6.2 Interworking with a public network

If the call is to enter a public network (ISDN or non-ISDN), a Progress indicator information element shall be sent in the direction of the calling user. This Progress indicator information element shall contain progress description 16 "Interworking with a public network".

ZC.6.3 Interworking with a network with limited release capability

If the call is to enter a network that is unable, or not always able, to supply an indication to the PISN that the call has been released, a Progress indicator information element shall be sent in the direction of the calling user. This Progress indicator information element shall contain one of the following progress descriptions:

- 17 "interworking with a network unable to supply a release signal";

- 18 "interworking with a network unable to supply a release signal before answer"; or,

- 19 "interworking with a network unable to supply a release signal after answer".

Progress description number 18 shall be used if the other network is able to indicate release after it has sent an answer signal to the PISN, but is not always able to indicate release in the event of no reply. The other network will rely on receiving a release signal from the PISN when release is initiated by the calling user or if answer does not occur within a reasonable time.

Progress description number 19 shall be used if the other network is able to indicate release prior to sending an answer signal to the PISN, but is not always able to indicate release after sending an answer signal. In this case, the other network will rely on receiving a release signal from the PISN when release is initiated by the calling user.

Progress description number 17 shall be used if the other network is not always able to indicate release prior to answer and is not always able to indicate release after answer. In this case, the other network will rely on receiving a release signal from the PISN if answer does not occur within a reasonable time and when release is initiated by the calling user.

ZC.7 Actions at an Originating PINX or Terminating PINX

Action, if any, on receipt of any additional progress descriptions specified in table ZC.1 is an implementation matter. Possible actions include the following:

- provision of an appropriate indication to the user on receipt of progress description 16;

- use later in the call as part of the process of determining whether a request for a supplementary service such as Call Transfer should be accepted.

Add the following new annex ZD:

Annex ZD (normative): Party category functionality

ZD.1 Introduction

This annex specifies the signalling protocol for the support of Party category functionality at the Q reference point. Party category functionality is defined in ETS 300 171 [10].

It is optional to support the procedures specified in this annex.

ZD.2 Signalling protocol for the support of Party category

ZD.2.1 Party category description

The purpose of Party category is to indicate, to another user, the category of a user involved in a call. An Originating PINX, for example, may include an indication of the calling user's category in the setup request sent across an inter-PINX link. A terminating PINX, for example, may include an indication of the called user's category in a report request sent to an Originating PINX.

The permitted party categories are:

- unknown;
- extension;
- operator; and,
- emergency extension.

ZD.2.2 Party category coding requirements

ZD.2.2.1 Information elements

The Party category information element is a variable length category 2 (see subclause 10.4.11.2) codeset 5 information element with the format shown in figure ZD.1 and coded as shown in table ZD.1.

NOTE: The general format and coding of variable length information elements is defined in subclause 14.5.1.

8	7	6	5	4	3	2	1	
Party category								
0	0	1	1	0	0	1	0	Octet 1
Information element identifier								
Length of Party category contents								Octet 2
1	0	0	0	0	Party category			Octet 3
ext	Reserved							

Figure ZD.1: Party category information element

Table ZD.1: Party category information element

Party category (octet 3)		
Bits	**3 2 1**	
	0 0 0	unknown
	0 0 1	extension
	0 1 0	operator
	0 1 1	emergency extension
All other values are reserved.		

ZD.2.2.2 Messages

If used to indicate the category of the calling user, the Party category information element shall be conveyed in the SETUP message sent by the outgoing side to the incoming side.

If used to indicate the category of the called user, the Party category information element shall be conveyed in the ALERTING message sent by the incoming side to the outgoing side.

If used to indicate the category of the connected user, the Party category information element shall be conveyed in the CONNECT message sent by the incoming side to the outgoing side.

NOTE: Because this information element is a codeset 5 information element, one of the shift information elements (see subclauses 14.5.3 and 14.5.4) will precede the Party category information element in each message in which it is sent.

ZD.2.3 Signalling procedures

The signalling protocol for Party category functionality operates in association with the protocol for basic circuit-switched call control, as specified in clause 10 of this ETS.

ZD.2.3.1 Actions at the Originating PINX

An Originating PINX initiating call establishment by transmitting a SETUP message across an inter-PINX link (see subclause 10.5.1) may include a Party category information element in the SETUP message to indicate the category of the calling user.

On receipt of an ALERTING message (see subclause 10.5.4) or a CONNECT message (see subclause 10.5.5) containing a Party category information element, the Originating PINX may optionally present the party category information to the calling user.

ZD.2.3.2 Actions at the Terminating PINX

On receipt of a SETUP message (see subclause 10.6.1) containing a Party category information element, the Terminating PINX may optionally present the party category information to the called user.

A Terminating PINX transmitting an ALERTING message (see subclause 10.6.2) may optionally include a Party category information element in the ALERTING message to indicate the category of the called user.

A Terminating PINX transmitting a CONNECT message (see subclause 10.6.4) may optionally include a Party category information element in the CONNECT message to indicate the category of the connected user.

ZD.2.3.3 Actions at a Transit PINX

A Transit PINX receiving a Party category information element in a SETUP, ALERTING or CONNECT message shall transparently pass on the information element to the next PINX.

ZD.2.4 Impact of interworking with public ISDNs or with non-ISDNs

ZD.2.4.1 At an Incoming Gateway PINX

When routeing a call entering the PISN (see subclause 10.7.1) an Incoming Gateway PINX may optionally include a Party category information element in the SETUP message to indicate the category of the calling user. Unless information has been supplied by the other network, the value "unknown" shall be used.

On receipt of an ALERTING message (see subclause 10.7.5) or a CONNECT message (see subclause 10.7.6) containing a Party category information element, an Incoming Gateway PINX may optionally present the party category information to the other network if the signalling system permits.

ZD.2.4.2 At an Outgoing Gateway PINX

On receipt of a SETUP message (see subclause 10.8.1) containing a Party category information element, an Outgoing Gateway PINX may optionally present the party category information to the other network if the signalling system permits.

An Outgoing Gateway PINX transmitting an ALERTING message (see subclause 10.8.4) may optionally include a Party category information element in the ALERTING message to indicate the category of the called user. Unless information has been supplied by the other network, the value "unknown" shall be used.

An Outgoing Gateway PINX transmitting a CONNECT message (see subclause 10.8.5) may optionally include a Party category information element in the CONNECT message to indicate the category of the connected user. Unless information has been supplied by the other network, the value "unknown" shall be used.

History

Document history	
December 1992	First Edition
January 1994	Second Edition
June 1995	Unified Approval Procedure UAP 31: 1995-06-19 to 1995-10-13
November 1995	Third Edition
February 1996	Converted into Adobe Acrobat Portable Document Format (PDF)

ISBN 2-7437-0338-5 - Edition 3
Dépôt légal : Novembre 1995