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Broadband ISDN – Signalling ATM adaptation layer (SAAL)

AAL type 2 signalling transport converter on SSCOP

ITU-T Recommendation Q.2150.2

(Previously CCITT Recommendation)

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

ITU-T RECOMMENDATION Q.2150.2

AAL TYPE 2 SIGNALLING TRANSPORT CONVERTER ON SSCOP

Summary

This Recommendation specifies the AAL type 2 signalling transport converter on SSCOP. This AAL type 2 signalling transport converter on SSCOP utilizes the Service Specific Connection Oriented Protocol for assured data transfer. This AAL type 2 signalling transport converter can be deployed on any protocol stack that supports SSCOP (e.g. AAL type 2 or AAL type 5). The sublayer structure, the PDU structures of the signalling transport converter sublayer, and the mechanisms for the provision of the AAL type 2 generic signalling transport service are defined in depth.

The intent of this Recommendation is to provide a new protocol specification that can be used primarily in the B-ISDN ATM environment for the provision of a signalling transport service. In particular, this protocol provides a Generic Signalling Transport Service that is used by the AAL type 2 signalling protocol.

Source

ITU-T Recommendation Q.2150.2 was prepared by ITU-T Study Group 11 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on 3 December 1999.

Keywords

AAL, ATM, B-ISDN, SAAL, SSCF, SSCOP, SSCS, STC.

FOREWORD

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NOTE

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

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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.

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Recommendation Q.2150.2

AAL TYPE 2 SIGNALLING TRANSPORT CONVERTER ON SSCOP

(Geneva, 1999)

1 Scope

This Recommendation specifies the AAL type 2 signalling transport converter sublayer directly on top of SSCOP [5] (which specifies the peer-to-peer protocol for the transfer of information and control between any pair of SSCOP entities). This AAL type 2 signalling transport converter on SSCOP can be deployed on any protocol stack that supports SSCOP (see 5.1). This Recommendation covers the specification of the sublayer structure, the PDU structures of the signalling transport converter sublayer, and the mechanisms for the provision of the AAL type 2 generic signalling transport service.

When this AAL type 2 signalling transport converter on SSCOP is applied for an AAL type 2 signalling protocol entity, that entity is liberated from considering peculiarities of the underlying signalling transport service. This is achieved by relying on a generic signalling transport service that is provided, for example, by the sublayer specified in this Recommendation.

This Recommendation describes the interactions between the AAL type 2 signalling transport converter (STC) and the next higher layer, i.e. the AAL type 2 signalling protocol entity, between the STC and the Service Specific Connection Oriented Protocol (SSCOP), and between the STC and layer management, as well as the STC peer-to-peer operations.

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.

[1] ITU-T Recommendation I.361 (1999), *B-ISDN ATM layer specification*.

[2] ITU-T Recommendation I.363.2 (1997), *B-ISDN ATM Adaptation Layer specification: Type 2 AAL*.

[3] ITU-T Recommendation I.363.5 (1996), *B-ISDN ATM Adaptation Layer specification: Type 5 AAL*.

[4] ITU-T Recommendation I.366.1 (1998), *Segmentation and Reassembly Service Specific Convergence Sublayer for the AAL type 2*.

[5] ITU-T Recommendation Q.2110 (1994), *B-ISDN ATM Adaptation Layer – Service specific connection oriented protocol (SSCOP)*.

[6] ITU-T Recommendation Q.2630.1 (1999), *AAL type 2 signalling protocol (Capability Set 1)*.

[7] ITU-T Recommendation X.200 (1994) | ISO/IEC 7498-1:1994, *Information technology – Open Systems Interconnection – Basic reference model: The basic model*.

[8] ITU-T Recommendation X.210 (1993) | ISO/IEC 10731:1994, *Information technology – Open Systems Interconnection – Basic Reference Model: Conventions for the definition of OSI services*.

3 Definitions

This Recommendation is based upon the concepts developed in Recommendations X.200 [7] and X.210 [8]. Details of the data unit naming convention used in this Recommendation can be found in Annex A.

Furthermore, this Recommendation is based upon the concepts developed in Recommendation Q.2110 [5], and makes use of the following terms defined in that Recommendation:

a) Service Specific Coordination Function;

b) Service Specific Connection Oriented Protocol.

4 Abbreviations

This Recommendation uses the following abbreviations:

AAL	ATM Adaptation Layer
ATM	Asynchronous Transfer Mode
B-ISDN	Broadband Integrated Services Digital Network
BR	Buffer Release
CPCS	Common Part Convergence Sublayer
LSB	Least Significant Bit
MSB	Most Significant Bit
MU	Message Unit
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
SAAL	Signalling AAL
SAP	Service Access Point
SAR	Segmentation and Reassembly Sublayer
SC	Sequence Control
SDL	Specification and Description Language
SDU	Service Data Unit
SN	Sequence Number
SSCF	Service Specific Coordination Function
SSCF-UNI	Service Specific Coordination Function for Support of Signalling at the User Network Interface
SSCOP	Service Specific Connection Oriented Protocol (Q.2110 [5])
SSCOP-UU	SSCOP User-to-User information
SSCS	Service Specific Convergence Sublayer
SSSAR	Service Specific Segmentation and Reassembly sublayer

SSTED	Service Specific Transmission Error Detection sublayer
STC	Signalling Transport Converter
SUD	STC User Data
UNI	User Network Interface

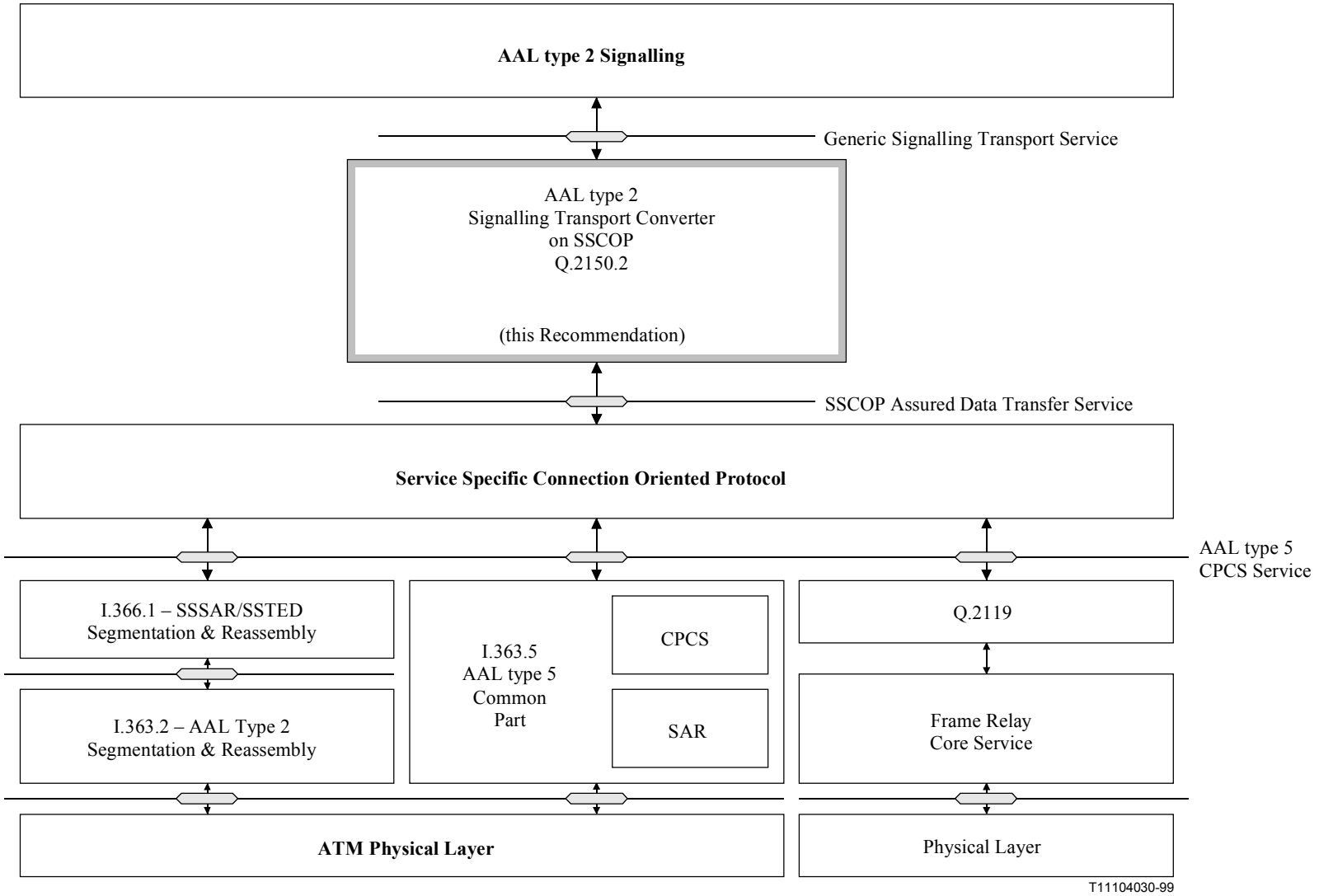
5 General description of the AAL type 2 signalling transport converter on SSCOP

5.1 Structure of the AAL type 2 signalling transport converter on SSCOP sublayer

The sublayer providing the AAL type 2 Signalling Transport Converter (STC) resides on top of the Service Specific Convergence Sublayer (SSCS) of the ATM Adaptation Layer (AAL). It deploys the services provided by the Service Specific Connection Oriented Protocol (SSCOP) defined in Recommendation Q.2110 [5]. SSCOP also resides in the SSCS.

In the SSCS, the Service Specific Coordination Function is "Null" in the sense that the primitives for the AAL are equivalent to the SSCOP primitives (see 6.2) but identified as AAL-primitives instead of AA-signals consistent with the primitive naming convention at a SAP (see 6.1/Q.2110 [5]).

The STC provides for the service that is requested by the Generic Signalling Transport Service defined in Recommendation Q.2630.1 [6], where the AAL type 2 signalling protocol makes use of this service. The STC relying on the assured data transfer service of SSCOP may utilize any protocol stack that supports SSCOP, i.e. provides the AAL type 5 CPCS service; this is illustrated in Figure 5-1.



NOTE 1 – The Service Access Points shown in this diagram are for modelling purposes only. They are not necessarily visible or accessible from outside.

NOTE 2 – There may exist more protocol stacks providing the AAL type 5 CPCS service than shown.

Figure 5-1/Q.2150.2 – Structure of the AAL type 2 signalling transport converter on SSCOP deploying different protocol stacks

This Recommendation specifies:

- the interactions between the STC and the AAL type 2 signalling protocol;
- the interactions between the STC and the SSCOP sublayer;
- the interactions between the STC and layer management; and
- the peer-to-peer protocol.

5.2 Services provided by the STC

The STC provides for the transparent transfer of data, i.e. STC user data between STC users. The supporting communication resources to achieve this transfer stay invisible to the STC user.

In particular, the STC service provides for:

a) Independence from the underlying transmission media:

The STC service relieves its users from all concerns of the manner in which the STC service is provided. Except for possible influences of the quality of service, the transfer of data over different underlying networks is, thus, invisible.

b) Transparency of the information transferred:

The STC service provides for the transparent transfer of octet-aligned STC user data. It does not restrict the content, format, or coding of the information nor is there ever a need to interpret its structure or meaning.

c) Connection establishment and release:

The STC service provides for a permanent connection service. As the underlying service (SSCOP) needs to have a connection established, the STC establishes and maintains this connection on behalf of its user; the user is informed about the availability of the assured data transfer service.

NOTE – The establishment of any connection below the SSCOP is outside the scope of this Recommendation.

5.3 Functions of the STC

The STC performs the following functions:

a) Connection establishment and maintenance:

This function provides for the establishment and maintenance of a SSCOP-connection. Upon a connection release by SSCOP, a connection re-establishment is attempted.

NOTE – The connection below the sublayer specified in Recommendation Q.2110 may be established either on demand or permanently.

b) Connection availability reporting to the STC user:

This function reports the availability or unavailability of the SSCOP-connection to the user of the STC.

In addition, the following SSCOP services are utilized (see Recommendation Q.2110 [5]):

c) Sequence Integrity of STC-SDUs.

d) Error Correction of STC-SDUs.

e) Flow Control of STC-SDUs.

f) Keep Alive.

6 Elements for layer-to-layer communication

6.1 The generic signalling transport service

This subclause specifies the information flow across the AAL type 2 signalling transport converter – AAL type 2 signalling protocol boundary. This boundary is defined in Recommendation Q.2630.1 [6] and summarized below. In the event of any difference between the following summary and the definitions in Recommendation Q.2630.1, the definitions in Recommendation Q.2630.1 take precedence.

6.1.1 Primitive definition

The services are summarized in Table 5-1, and are defined as follows.

a) IN-SERVICE.indication:

This primitive indicates that the signalling transport is able to exchange signalling messages with the peer entity. This indication shall be provided without the AAL type 2 signalling protocol requesting any service across the SAP. The parameter "Level" indicates the congestion level at which the service operation will commence.

b) OUT-OF-SERVICE.indication:

This primitive indicates that the signalling transport is unable to exchange signalling messages with the peer entity. This indication shall be provided without the AAL type 2 signalling protocol requesting any service across the SAP.

c) TRANSFER.request:

This primitive shall be used by the AAL type 2 signalling protocol to convey a signalling message to its peer entity.

d) TRANSFER.indication:

This primitive provides a signalling message from the peer entity to the AAL type 2 signalling protocol.

e) CONGESTION.indication:

This primitive that should convey information concerning signalling congestion is not used.

NOTE – In Recommendation Q.2630.1 it is specified that not all of the signalling transport services may issue the CONGESTION.indication primitive.

Table 5-1/Q.2150.2 – Primitives and parameters of the Generic Signalling Transport Sublayer

Primitive Generic Name	Type			
	Request	Indication	Response	Confirmation
IN-SERVICE	–	Level	–	–
OUT-OF-SERVICE	–	(Note)	–	–
CONGESTION	–	Level	–	–
TRANSFER	Sequence Control STC User Data	STC User Data	–	–
– This primitive is not defined. NOTE – This primitive has no parameters.				

6.1.2 Parameters

a) STC User Data:

This parameter contains a complete signalling message. This message shall not be greater than 4000 octets.

b) Level:

This parameter indicates a level of the congestion. This parameter shall have a value between 0 and 10, where 0 indicates no congestion and 10 indicates the maximum congestion.

NOTE 1 – The STC defined in this Recommendation only uses value "0" for this parameter.

c) Sequence Control:

This parameter, an 8-bit identifier, allows the Generic Signalling Transport service to perform load sharing between several signalling transports without violating sequence delivery requirements. Any signalling message accompanied by the same Sequence Control value shall be conveyed on the same signalling transport.

NOTE 2 – The mapping of the Sequence Control parameter onto a designation of the signalling transport to be deployed is an implementation matter.

NOTE 3 – The STC defined in this Recommendation does not use this parameter.

6.1.3 Establishment

On the establishment of an AAL type 2 signalling transport converter entity and the associated signalling transport converter user entity, for example at power up, the initial conditions is the same as if an OUT-OF-SERVICE.indication primitive had been conveyed across this SAP.

6.2 The Service provided by SSCOP

This subclause specifies the information flow across the AAL type 2 signalling transport converter – AAL Service Specific Convergence Sublayer (SSCOP) boundary. This boundary is defined in 6.1/Q.2110 [5] and summarized below. In the event of any difference between the following summary and the definitions in Recommendation Q.2110, the definitions in Recommendation Q.2110 take precedence.

The repertoire of AAL-primitives between STC and SSCOP is defined in Table 5-2.

Table 5-2/Q.2150.2 – SSCOP primitives and parameters

Primitive Generic Name	Type			
	Request	**Indication**	**Response**	**Confirmation**
AAL-ESTABLISH	SSCOP-UU BR	SSCOP-UU	SSCOP-UU BR	SSCOP-UU
AAL-RELEASE	SSCOP-UU (Note 2)	SSCOP-UU Source	–	(Notes 1 and 2)
AAL-DATA	MU	MU SN	–	–
AAL-RESYNC	SSCOP-UU (Note 2)	SSCOP-UU	(Note 1)	(Notes 1 and 2)
AAL-RECOVER	–	(Note 1)	(Note 1)	–
AAL-UNITDATA	MU (Note 2)	MU (Note 2)	–	–

Table 5-2/Q.2150.2 – SSCOP primitives and parameters *(concluded)*

Primitive Generic Name	Type			
	Request	Indication	Response	Confirmation
AAL-RETRIEVE	RN (Note 2)	MU (Note 2)	–	–
AAL-RETRIEVE COMPLETE	–	(Notes 1 and 2)	–	–

– This primitive is not defined.

NOTE 1 – This primitive has no parameters.

NOTE 2 – This primitive is not used by the STC.

6.2.1 Primitive definition

The definition of these primitives is as follows:

a) AAL-ESTABLISH:

The AAL-ESTABLISH primitives are used to establish a point-to-point connection for assured information transfer between peer user entities.

b) AAL-RELEASE:

The AAL-RELEASE primitives are used to terminate a point-to-point connection for assured information transfer between peer user entities.

c) AAL-DATA:

The AAL-DATA primitives are used for the assured point-to-point transfer of SDUs between peer user entities.

d) AAL-RESYNC:

The AAL-RESYNC primitives are used to resynchronize the SSCOP connection.

NOTE 1 – The AAL-RESYNC primitives are not used actively by the protocol specified in this Recommendation; however, to provide robustness the indication and response primitives are nevertheless specified.

e) AAL-RECOVER:

The AAL-RECOVER primitives are used during recovery from protocol errors.

NOTE 2 – In the absence of protocol errors, the AAL-RECOVER primitives will not be used; however, to provide robustness, the indication and response primitives are nevertheless specified.

NOTE 3 – The AAL-UNITDATA, AAL-RETRIEVE, and AAL-RETRIEVE-COMPLETE primitives are not used by the protocol entity specified in this Recommendation.

6.2.2 Parameter definition

Table 5-2 lists the parameters associated with each SSCOP primitive. The definition of the parameters is as follows:

a) MU (Message Unit):

The Message Unit parameter is used during information transfer to convey a variable-length message. In AAL-DATA.request primitives, this parameter is mapped transparently into the Information field of an SSCOP PDU. For AAL-DATA.indication primitives, this parameter contains the contents of the information field of the received SSCOP PDU.

b) SSCOP-UU (SSCOP User-to-User information):

The STC does not make use of this parameter. When issuing "request" or "response" primitives, this parameter has length zero; on receiving it in "indication" or "confirmation" primitives, this parameter is ignored.

c) SN (Sequence Number):

The STC does not make use of this parameter. When receiving it in the DATA.indication primitive, this parameter is ignored.

d) BR (Buffer Release):

The STC does not make use of the functionality of this parameter. In both, the AAL-ESTABLISH.request and AAL-ESTABLISH.response primitives, this parameter is set to "Yes".

e) Source:

The source parameter indicates to the SSCOP user whether the SSCOP layer or the peer SSCOP user originated the connection release. This parameter assumes one of two values: "SSCOP" or "User". If "SSCOP" is indicated, the user should disregard the SSCOP-UU parameter, if present.

6.3 Primitives between the STC and layer management

Error indications to layer management are performed by the lower layers and no additional error indications are required from the STC. No primitives between the STC and layer management need to be defined.

6.4 State transition diagram for sequences of primitives at the layer boundaries of the STC

This subclause defines the constraints on the sequences in which the primitives may occur at the layer boundaries of the STC. The sequences are related to the states at one STC endpoint between the STC and the STC user and between the STC and SSCOP.

NOTE – No state changes occur between the STC and layer management.

The possible overall sequences of primitives at an STC connection endpoint are shown in the state transition diagram, Figure 6-1. These primitives and state transitions are defined in Recommendation Q.2630.1 [6]. If any discrepancy is detected between the representation here and the one in Recommendation Q.2630.1, the definition in Q.2630.1 shall apply.

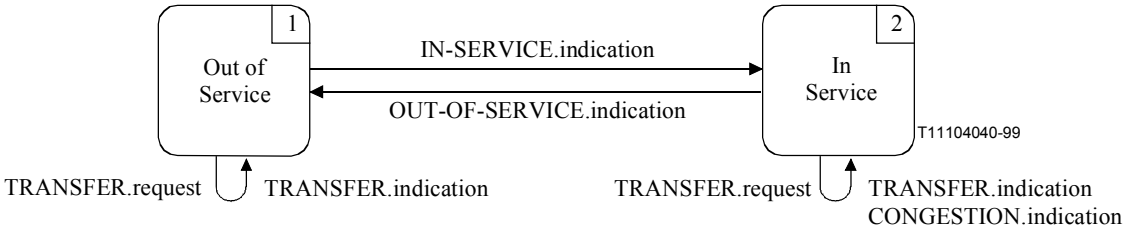


Figure 6-1/Q.2150.2 – State transition diagram for sequences of primitives between the STC and its user

The possible overall sequences of primitives at a point-to-point SSCOP endpoint are shown in the state transition diagram, Figure 6-2. These primitives and state transitions are defined in Recommendation Q.2110 [5]. If any discrepancy is detected between the representation here and the one in Recommendation Q.2110, the definition in Recommendation Q.2110 shall apply.

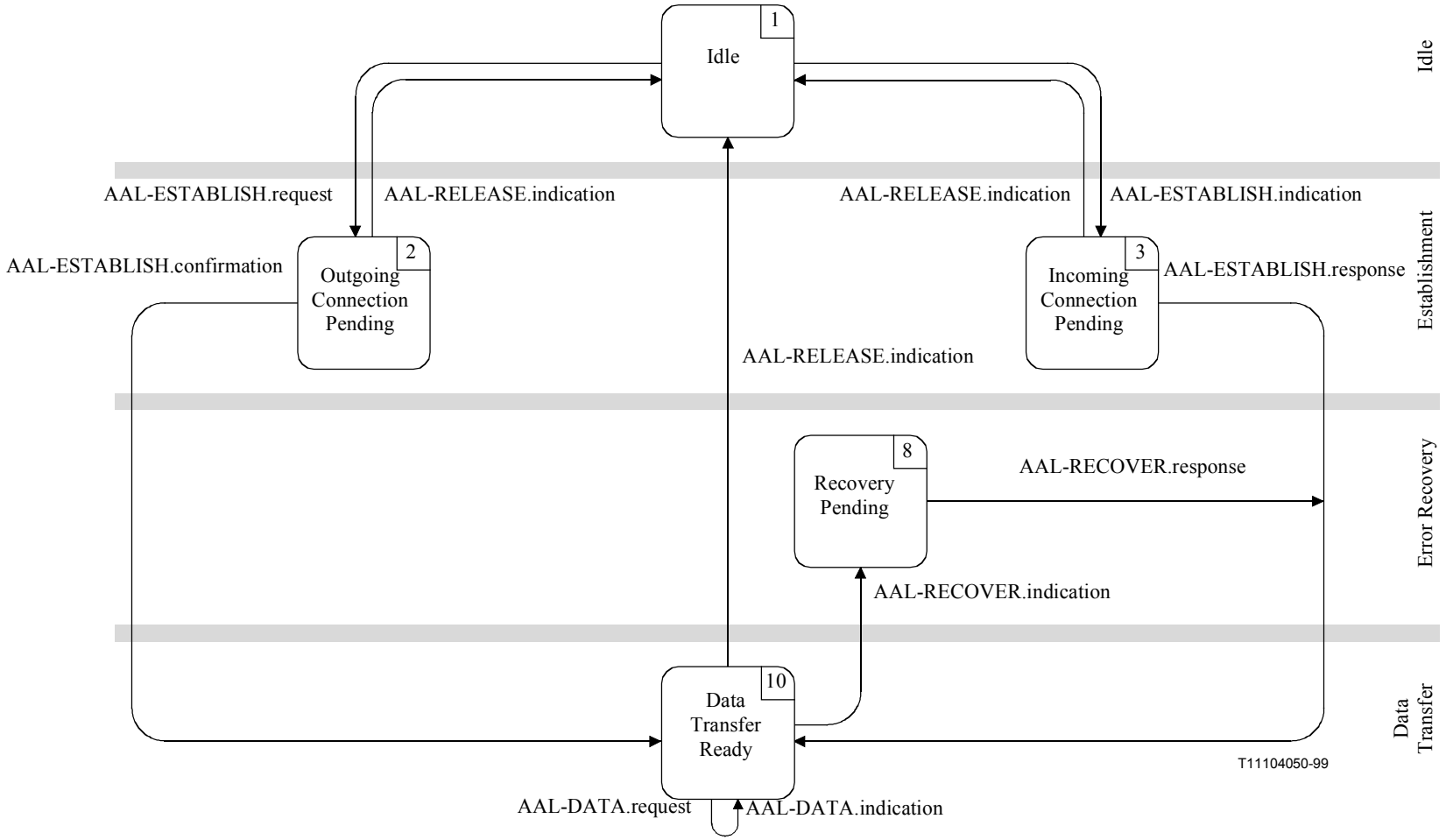


Figure 6-2/Q.2150.2 – State transition diagram for sequences of primitives between the STC and SSCOP

The model illustrates the behaviour of the STC as seen by the STC or the subset of behaviour of the SSCOP as deployed by the STC. This model assumes that a request or response primitive is never issued at the same time as an indication or confirmation primitive. The model also assumes that the primitives are serviced immediately and in zero time. In the diagram:

a) Any primitive which is not shown as resulting in a transition (from one state to the same state, or from one state to a different state) is not permitted in that state.

b) It is assumed that the primitives passed between STC and the STC user as well as the primitives passed between the STC and SSCOP are coordinated such that collisions do not occur.

c) The Idle state (state 1) in Figure 6-2 reflects the absence of an SSCOP-connection. It is the initial state of any sequence; once it is re-entered, the connection is released.

d) The Out-of-Service state (state 1) in Figure 6-1 reflects the non-availability of an STC-connection. It is the initial state of any sequence.

7 Protocol elements for peer-to-peer communication

The peer-to-peer STC protocol utilizes the mechanisms provided by the underlying sublayer (SSCOP, Recommendation Q.2110 [5]). In particular:

- In order to provide the assured data transfer service and report the availability of this transport to its user, the STC uses the connection establishment and release service of SSCOP, i.e. the primitives AAL-ESTABLISH and AAL-RELEASE. No additional information is conveyed via the SSCOP-UU parameter.
- Data transfer utilizes SSCOP's assured data transfer service including the imbedded flow control mechanism.
- The use of SSCOP's resynchronization service by the peer STC entity is an error and is ignored, i.e. the Data Transfer Ready state is re-entered immediately.
- SSCOP's error recovery service is ignored, i.e. the Data Transfer Ready state is re-entered immediately.
- SSCOP's unassured data transfer service is not used, i.e. the STC never issues the primitives AAL-UNITDATA.request and ignores received AAL-UNITDATA.indication primitives.
- SSCOP's data retrieval service is not used, i.e. the STC never issues the primitives AAL-RETRIEVE request and, hence, never receives the primitives AAL-RETRIEVE-indication and AAL-RETRIEVE-COMPLETE indication.

7.1 STC PDUs

The STC has no need of its own special PDUs; the SDUs received from the STC user are transmitted via the AAL-DATA primitives without any additional protocol control information. The PDU parameter of the TRANSFER primitives at the upper boundary of the STC are mapped unchanged to the MU parameter of the DATA primitives at the lower boundary and vice versa.

7.2 STC PDU formats

Figure 7-1 illustrates the format of the STC PDU. The coding of the STC PDUs conforms to the coding conventions specified in 2.1/I.361.

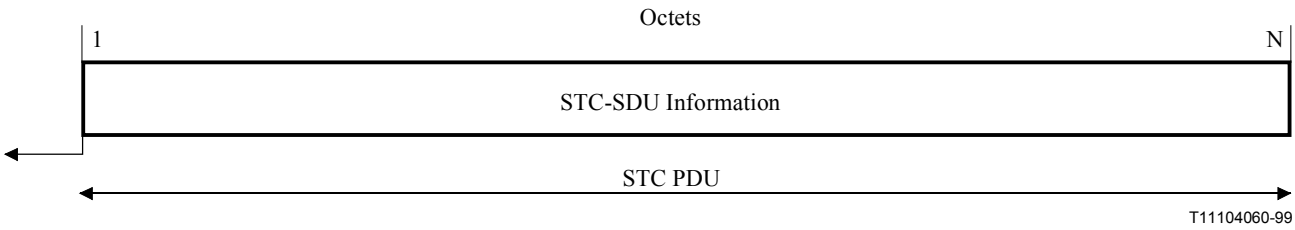


Figure 7-1/Q.2150.2 – STC Data PDU

7.3 STC PDU fields

The STC PDU contains the following field:

- STC-SDU Information field:

  The STC-SDU Information field in the DATA PDU contains a complete STC-SDU.

7.4 STC state variables

The STC maintains no state variables.

7.5 STC timers

The STC entity requires the following timer:

- Timer_DELAY:

  If the STC procedure is in state "1.1" (Idle), the Timer_DELAY is running. It protects the unnecessary consumption of resources if an SSCOP connection could not be established or has been released. During the time when Timer_DELAY is running, the STC service is unavailable. Expiry of this timer leads to a re-establishment attempt of the SSCOP connection. This timer should be considerably greater than Timer_CC times MaxCC.

8 Specification of the STC

This clause provides a set of SDL diagrams defining the procedures of the AAL type 2 Signalling Transport Converter (STC). These SDL diagrams are the definitive description of the procedures and in case of conflict with the text, the SDL diagrams take precedence.

8.1 Overview

Figure 8-1 gives an overview over the states of STC and the major transitions between them. These states are grouped into communication control services.

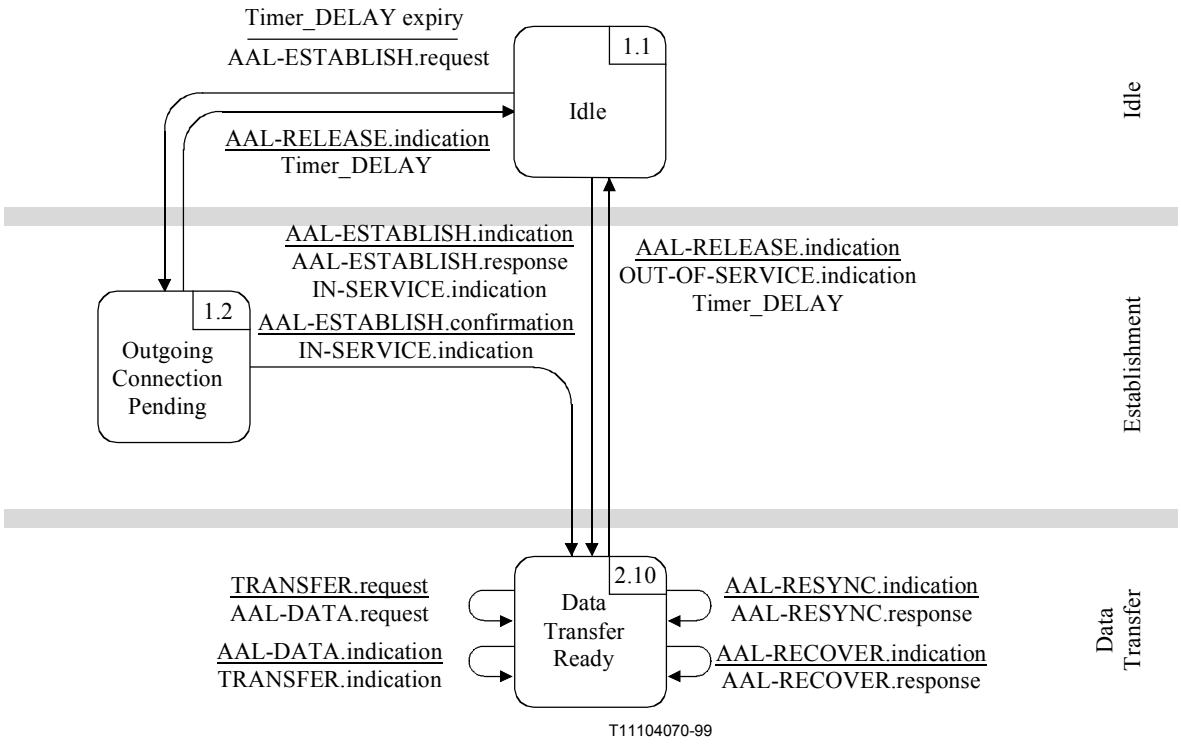


Figure 8-1/Q.2150.2 – Overview of STC states and major transitions between them

These states are used in the specification of the peer-to-peer protocol. The states are conceptual and reflect general conditions of the STC entity in the sequences of primitives and PDU exchanges with its user, peer, underlying sublayer, or layer management.

The state numbers reflect the state of the interfaces at the two layer boundaries of the STC. They are of the form "U.L" where "U" represents the state of the interface at the upper layer boundary (see Figure 6-1) and "L" the one at the lower layer boundary (see Figure 6-2).

8.1.1 Idle

State 1.1 Idle:

In this state, no service is available. No data is received. If the STC user submits data for transfer with the TRANSFER.request primitive, the primitive is ignored.

8.1.2 Establishment

The state in this connection control service assists the STC in establishing STC-connections. The following state is defined:

State 1.2 Outgoing Connection Pending:

In this state, no service is available. The STC instructed SSCOP to establish a new connection with its peer and awaits the peer's response. No data is received. If the STC user submits data for transfer with the TRANSFER.request primitive, the primitive is ignored.

8.1.3 Data Transfer

The state in this connection control service allows data transfer.

State 2.10 Data Transfer Ready:

In this state, service is available and data transfer takes place.

8.2 State Transition Table

The State Transition (see Table 8-1) for STC describes the primitives and primitives that lead to state transitions. The table only shows the major transition paths; the SDL diagrams in 8.3 show the full transitions.

Table 8-1/Q.2150.2 – State transition table

Event	State		
	1.1	**1.2**	**2.10**
AAL-ESTABLISH.indication	reset Timer_DELAY AAL-ESTABLISH. Response IN-SERVICE. Indication (Level := 0) → 2.10	–	–
AAL-ESTABLISH.confirmation	–	IN-SERVICE. indication (Level := 0) → 2.10	–
AAL-RELEASE.indication	–	set Timer_DELAY → 1.1	OUT-OF-SERVICE. indication set Timer_DELAY → 1.1
AAL-DATA.indication	–	–	TRANSFER.indication → 2.10
AAL-RECOVER.indication	–	–	AAL-RECOVER. response 2.10
TRANSFER.request	–	–	AAL-DATA.request → 2.10
Timer_DELAY expiry	AAL-ESTABLISH. Request → 1.2	–	–

8.3 SDL diagrams

The SDL diagrams are represented in Figures 8-2 to 8-4.

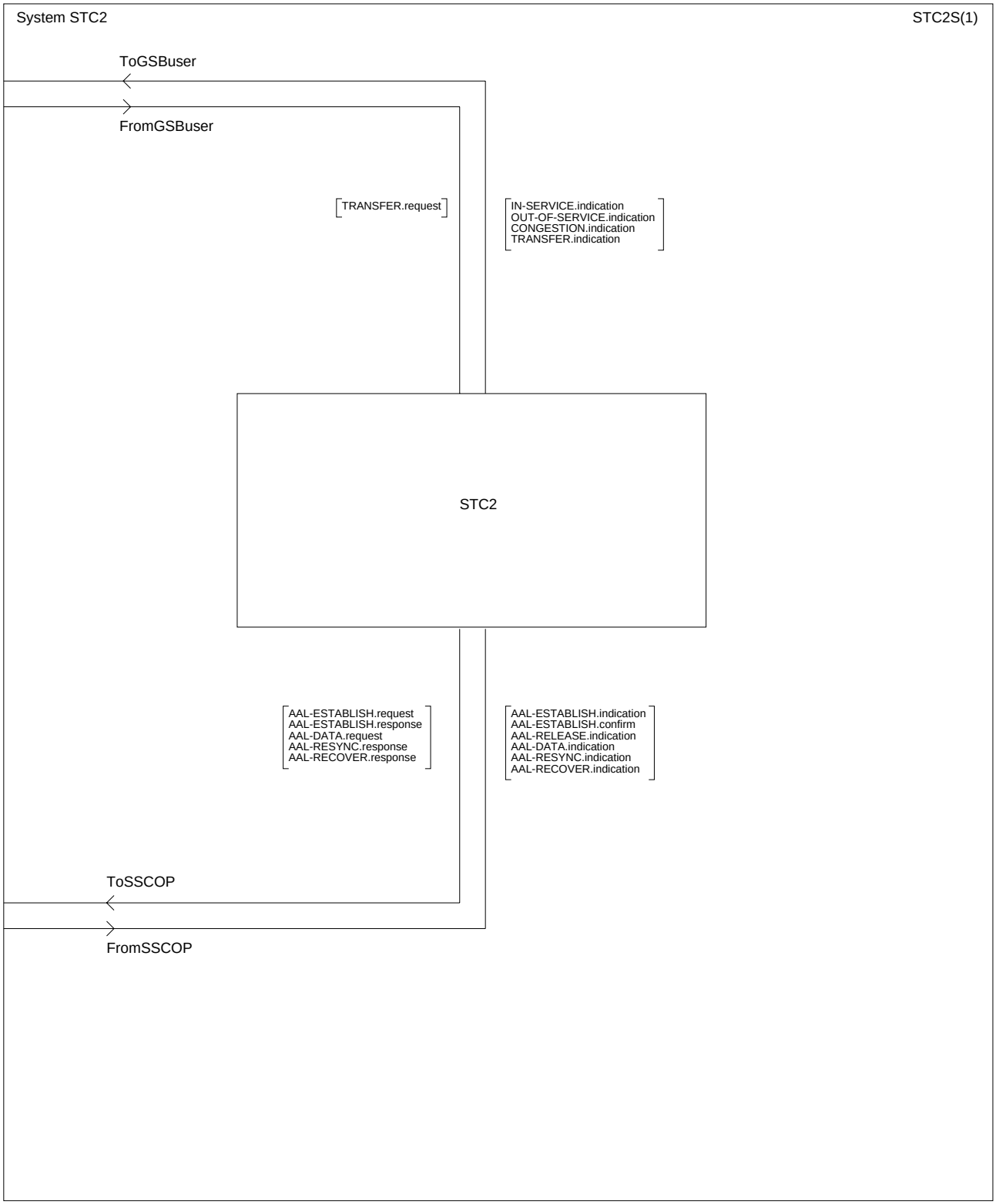


Figure 8-2/Q.2150.2 – SDL system of the AAL type 2 signalling transport converter

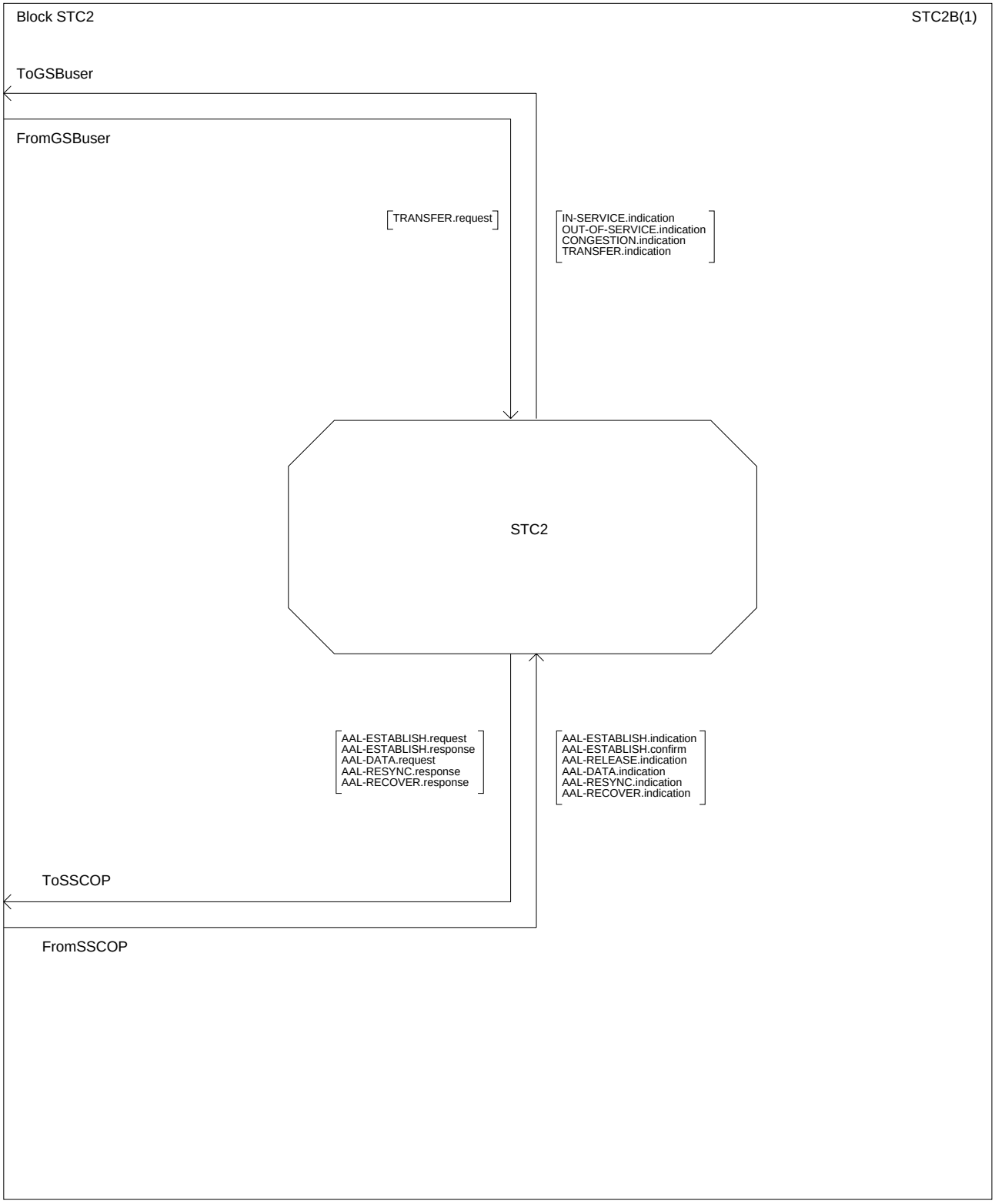


Figure 8-3/Q.2150.2 – SDL block structure of the AAL type 2 signalling transport converter

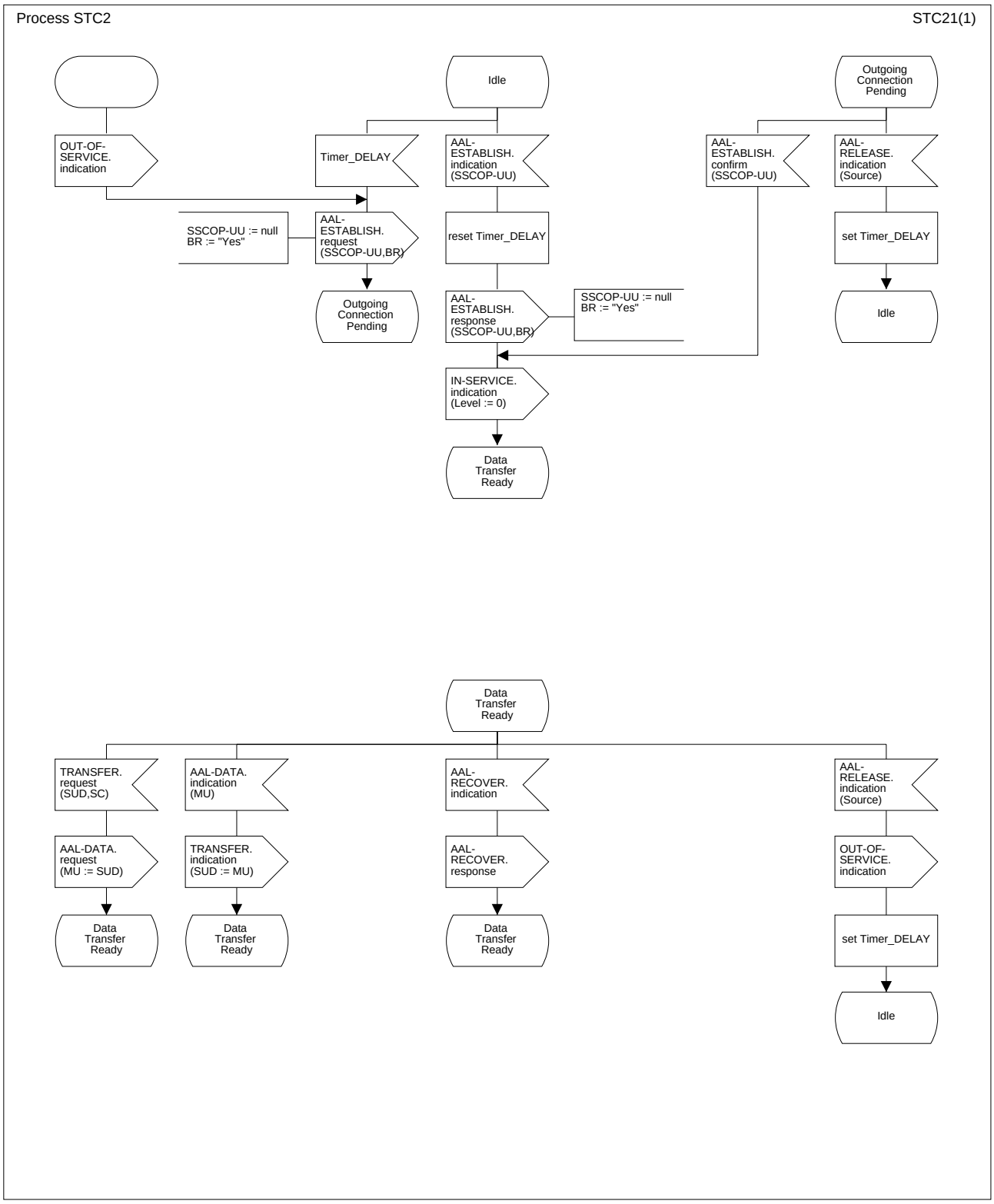


Figure 8-4/Q.2150.2 – SDL diagram for the AAL type 2 signalling transport converter

APPENDIX I

AAL type 2 Signalling Transport Converter on SSCF-UNI

I.1 Scope

This appendix illustrates the AAL type 2 signalling transport converter sublayer on top of the signalling AAL specified in Recommendation Q.2130 "SSCF-UNI" (which specifies the peer-to-peer protocol for the transfer of information and control between any pair of SSCF-UNI entities). This AAL type 2 signalling transport converter on SSCF-UNI can be deployed on any protocol stack that supports SSCOP (see 5.1). This appendix covers the specification of the sublayer structure, the PDU structures of the signalling transport converter sublayer, and the mechanisms for the provision of the AAL type 2 generic signalling transport service.

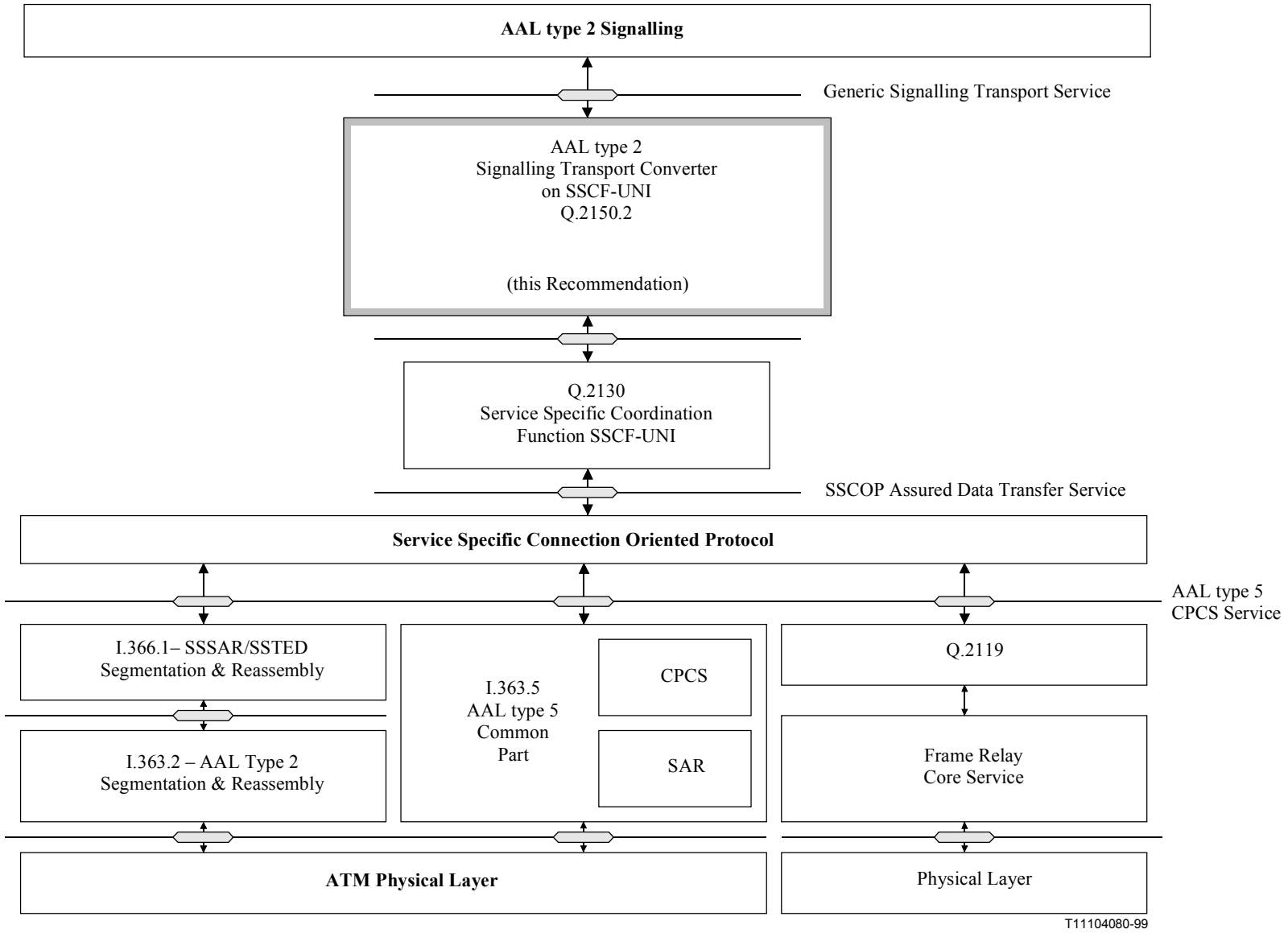
I.2 Additional references

[9] ITU-T Recommendation Q.2130 (1994), *B-ISDN ATM Adaptation Layer – Service specific coordination function for support of signalling at the user-network interface (SSCF at UNI)*.

I.3 Structure of the AAL type 2 signalling transport converter on SSCOP sublayer

The sublayer providing the AAL type 2 Signalling Transport Converter (STC) resides on top of the Service Specific Convergence Sublayer (SSCS) of the ATM Adaptation Layer (AAL). It deploys the services provided by Service Specific Coordination Function for Support of Signalling at the User Network Interface (SSCF-UNI) defined in Recommendation Q.2130 [9]. The Service Specific Connection Oriented Protocol (SSCOP, Recommendation Q.2110 [5]) also resides in the SSCS.

The STC provides for the service that is requested by the Generic Signalling Transport Service defined in Recommendation Q.2630.1 [6], where the AAL type 2 signalling protocol makes use of this service. The STC relying on the assured data transfer service of SSCF-UNI and SSCOP may utilize any protocol stack that supports SSCOP, i.e. provides the AAL type 5 CPCS service; this is illustrated in Figure I.1.



NOTE – There may exist more protocol stacks providing the AAL type 5 CPCS service than shown.

Figure I.1/Q.2150.2 – Structure of the AAL type 2 signalling transport converter on SSCOP deploying different protocol stacks

I.4 The service provided by SSCF-UNI

This subclause specifies the information flow across the AAL type 2 signalling transport converter – AAL Service Specific Convergence Sublayer (SSCF-UNI) boundary. This boundary is defined in 7.1/Q.2130 [9] and summarized below. In the event of any difference between the following summary and the definitions in Recommendation Q.2130, the definitions in Recommendation Q.2130 take precedence.

The repertoire of AAL-primitives between STC and SSCOP is defined in Table I.1.

Table I.1/Q.2150.2 – SSCOP primitives and parameters

Primitive Generic Name	Type			
	Request	Indication	Response	Confirmation
AAL-ESTABLISH	SSCF-UU	SSCF-UU	–	SSCF-UU
AAL-RELEASE	SSCF-UU (Note 2)	SSCF-UU	–	(Notes 1 and 2)
AAL-DATA	Data	Data	–	–
AAL-UNITDATA	Data (Note 2)	Data (Note 2)	–	–

– This primitive is not defined.

NOTE 1 – This primitive has no parameters.

NOTE 2 – This primitive is not used by the STC.

I.4.1 Primitive definition

The definition of these primitives is as follows:

a) **AAL-ESTABLISH**:

The AAL-ESTABLISH primitives are used to establish a point-to-point connection for assured information transfer between peer user entities at the UNI.

b) **AAL-RELEASE**:

The AAL-RELEASE primitives are used to terminate a point-to-point connection for assured information transfer between peer user entities at the UNI.

c) **AAL-DATA**:

The AAL-DATA primitives are used for the assured point-to-point transfer of SDUs between peer user entities.

NOTE – The AAL-UNITDATA primitives are not used by the protocol entity specified in this Recommendation.

I.4.2 Parameter definition

Table 5-2 lists the parameters associated with each SSCF-UNI primitive. The definition of the parameters is as follows:

a) **Data**:

The Data parameter is used during information transfer to convey a variable-length message. In AAL-DATA.request primitives, this parameter is mapped transparently into the Information field of an SSCF PDU. For AAL-DATA.indication primitives, this parameter contains the contents of the information field of the received SSCF PDU.

b) **SSCF-UU (SSCF user-to-user information)**:

The SCF does not make use of this parameter. When issuing "request" or "response" primitives, this parameter has length zero; on receiving it in "indication" or "confirmation" primitives, this parameter is ignored.

NOTE – In ITU-T Recommendation Q.2130 it is specified that this parameter is not specifically required by applications; however, its use by future signalling applications is not excluded.

The possible overall sequences of primitives at a point-to-point SSCF-UNI endpoint are shown in the state transition diagram, Figure I.2. These primitives and state transitions are defined in Recommendation Q.2130 [9]. If any discrepancy is detected between the representation here and the one in Recommendation Q.2130, the definition in Recommendation Q.2130 shall apply.

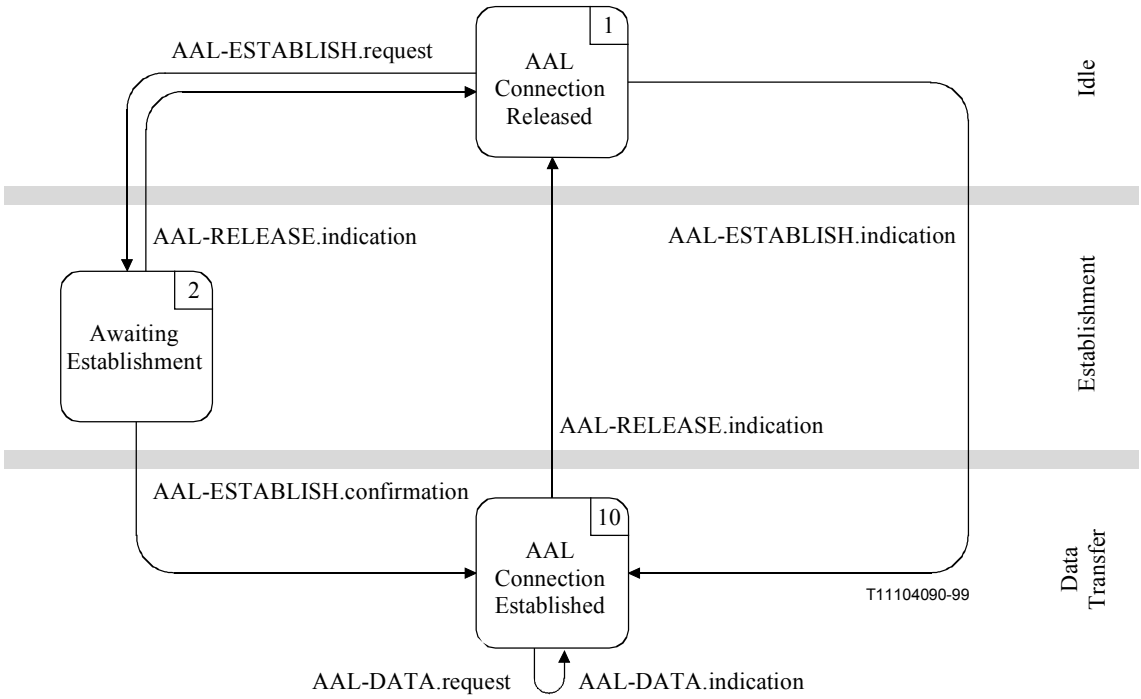


Figure I.2/Q.2150.2 – State transition diagram for sequences of primitives between the STC and SSCF-UNI

I.5 State transition table

The state transition table (see Table I.2) for STC describes the primitives and primitives that lead to state transitions. The table only shows the major transition paths; the SDL diagrams in 8.3 show the full transitions.

Table I.2/Q.2150.2 – State transition table

Event	State		
	1.1	**1.2**	**2.4**
AAL-ESTABLISH.indication	reset Timer_DELAY IN-SERVICE. indication (Level := 0) → 2.4	–	→ 2.4
AAL-ESTABLISH.confirmation	–	IN-SERVICE. indication (Level := 0) → 2.4	–
AAL-RELEASE.indication	–	set Timer_DELAY → 1.1	OUT-OF-SERVICE. indication set Timer_DELAY → 1.1
AAL-DATA.indication	–	–	TRANSFER.indication → 2.4
TRANSFER.request	–	–	AAL-DATA.request → 2.4
Timer_DELAY expiry	AAL-ESTABLISH. request → 1.2	–	–

I.6 SDL diagrams

The SDL diagrams for the procedure is represented in Figure I.3.

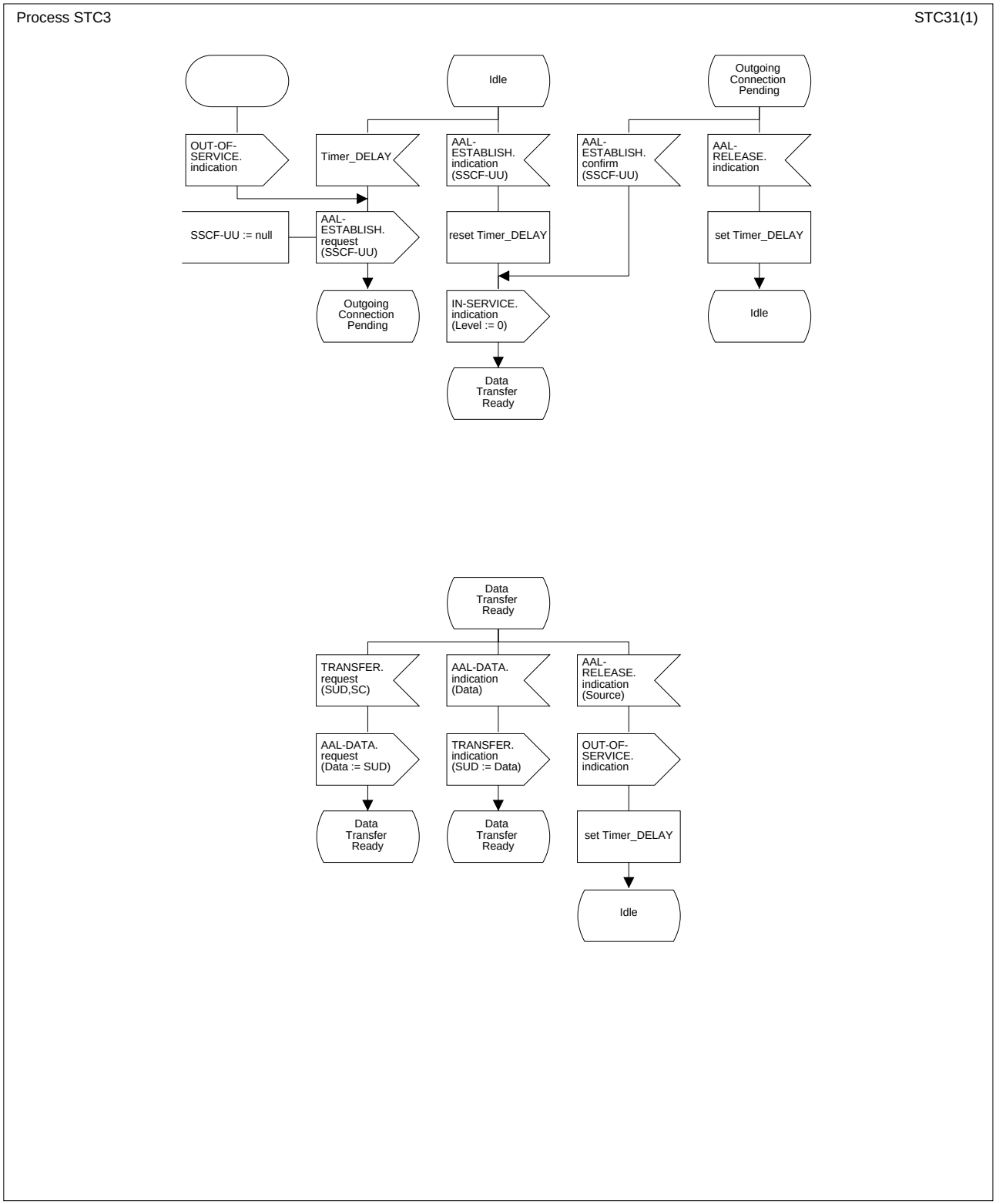


Figure I.3/Q.2150.2 – SDL diagram for the AAL type 2 signalling transport converter

APPENDIX II

Protocol Implementation Conformance Statement (PICS) Proforma

There exist no actions of the Signalling Transport Converter that are visible from outside the system; therefore, a Protocol Implementation Conformance Statement is not possible. If the generic signalling transport service is based on SSCOP, all of clauses 7 and 8 apply.

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