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**Terrestrial Trunked Radio (TETRA);
Voice plus Data (V+D);
Part 12: Supplementary services stage 3;
Sub-part 7: Short Number Addressing (SNA)**

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

Internet: secretariat@etsi.fr - <http://www.etsi.org>

Tel.: +33 4 92 94 42 00 - Fax: +33 4 93 65 47 16

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Foreword

This European Telecommunication Standard (ETS) has been produced by the Terrestrial Trunked Radio (TETRA) Project of the European Telecommunications Standards Institute (ETSI).

This ETS consists of 14 parts as follows:

- Part 1: "General network design";
- Part 2: "Air Interface (AI)";
- Part 3: "Interworking at the Inter-System Interface (ISI)";
- Part 4: " Gateways basic operation";
- Part 5: "Peripheral Equipment Interface (PEI)";
- Part 6: "Line connected Station (LS)";
- Part 7: "Security";
- Part 9: "General requirements for supplementary services";
- Part 10: "Supplementary services stage 1";
- Part 11: "Supplementary services stage 2";
- Part 12: "Supplementary services stage 3";**
- Part 13: "SDL model of the Air Interface (AI)";
- Part 14: "Protocol Implementation Conformance Statement (PICS) proforma specification".

Transposition dates	
Date of adoption of this ETS:	7 April 2000
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1 Scope

The present ETS specifies the stage 3 description of the Supplementary Service Short Number Addressing (SS-SNA) for the Terrestrial Trunked Radio (TETRA).

SS-SNA enables the served user to send an abbreviated number instead of a full identity to the infrastructure. Additionally SS-SNA may either invoke or suppress other supplementary services.

Man-Machine Interface (MMI) and charging principles are outside the scope of this ETS.

Supplementary service specifications are produced in three stages according to the method defined in CCITT Recommendation I.130 [1].

The stage 1 description specifies the service from the user's point of view (see ETS 300 392-10-7 [8]). The Stage 2 description (see ETS 300 392-11-7 [9]) identifies the functional capabilities and the information flows needed to support the service as specified in its stage 1 description. The present stage 3 description specifies the protocols at the air interface and at the various Inter-System Interfaces (ISI) to support SS-SNA.

NOTE: According to CCITT Recommendation I.130 [1], the stage 3 description of any telecommunication service addresses the network implementation aspects. Consequently it comprises two steps: the specifications of all protocols at the various reference points involved in any of the service procedures (notably the service operation) are the first step of the stage 3 description, and the specifications of the functions of the corresponding network entities are its second step.

The latter have not been provided since they can be derived from the specification of the functional entity actions in the stage 2 description.

This ETS is applicable to Voice plus Data individual call or group call; more specifically to the following entities:

- the MS/LS of the calling user in an individual call or a group call;
- to the originating Switching and Management Infrastructure (SwMI) in an individual call or a group call; and
- optionally, for managing the supplementary service, to the home SwMI and the MS/LS of the individual subscriber for whom SS-SNA has been subscribed and to the MS/LS(s) of the user(s) authorized to do so (i.e. manage the supplementary service) for that subscriber.

2 Normative references

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.

- [1] CCITT Recommendation I.130 (1988): "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".
- [2] ETSI ETS 300 392-2: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 2: Air Interface (AI)".
- [3] ETSI ETS 300 392-3-1: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 1: General design".

- [4] ETSI ETS 300 392-3-2: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 2: Additional Network Feature Individual Call (ANF-ISIIC)".
- [5] ETSI ETS 300 392-3-3: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 3: Additional Network Feature Group Call (ANF-ISIGC)".
- [6] ETSI ETS 300 392-3-5: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 5: Additional Network Feature for Mobility Management (ANF-ISIMM)".
- [7] ETSI ETS 300 392-9: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 9: General requirements for supplementary services".
- [8] ETSI ETS 300 392-10-7: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 7: Short number addressing".
- [9] ETSI ETS 300 392-11-7: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 11: Supplementary services stage 2; Sub-part 7: Short Number Addressing (SNA)".
- [10] ETSI ETR 300-5: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Designers' guide; Part 5: Guidance on Numbering and addressing".
- [11] ITU-T Recommendation Z.100: "CCITT specification and description language (SDL)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this ETS, the definitions of ETS 300 392-9 [7] apply, in addition to the following:

authorized user: identified user who is allowed to define SS-SNA short numbers for individual subscribers and/or interrogate the infrastructure about the SS-SNA short numbers defined for individual subscribers

served user: individual user for whom SS-SNA supplementary service has been subscribed. That user can thus successfully invoke the supplementary service. Short numbers may be defined for that user (by the authorized user or by other means outside the scope of this ETS), and possibly assigned to his MS/LS. Interrogation may also be placed about those definitions (by the authorized user or by other means outside the scope of this ETS)

served user SwMI: SwMI where the served user is currently registered. The served user SwMI is the originating SwMI in a call

3.2 Abbreviations

For the purposes of this ETS, the following abbreviations apply:

ANF-ISIGC	Additional Network Feature - Inter-System Interface Group Call
ANF-ISIIC	Additional Network Feature - Inter-System Interface Individual Call
ANF-ISIMM	Additional Network Feature - Inter-System Interface Mobility Management
ANF-ISISS	Additional Network Feature - Inter-System Interface Supplementary Service
GTSI	Group TETRA Subscriber Identity
ISI	Inter-System Interface
ITSI	Individual TETRA Subscriber Identity
LS	Line Station
MS	Mobile Station
PDU	Protocol Data Unit
ROSE	Remote Operation Service Element
SDL	Specification Description Language
SNA	Short Number Addressing
SS	Supplementary Service

NOTE: The abbreviation SS is only used when referring to a specific supplementary service (e.g. SS-SNA).

SSI	Short Subscriber Identity
SwMI	Switching and Management Infrastructure

4 SS-SNA service description

4.1 General

SS-SNA enables the calling user to establish a call in shortening the number dialled for the called party, whether it is a TETRA individual subscriber, a group or an external user. As an option, using SS-SNA short numbers may invoke some other specific supplementary services or bar the invocation of others (e.g. call barring). The corresponding definition of the short number used by the calling user shall be known by the originating SwMI.

This clause describes the SS-SNA services offered by the Circuit Mode Control Entity (CMCE) at the Supplementary Services service access point (TNSS-SAP) of the TETRA voice plus data layer 3 service boundary in a TETRA Mobile Station (MS) or TETRA Line Station (LS). The SS-SNA service access point is used in conformance testing as a normative boundary in MSs and LSs.

NOTE: As this document deals only with SS-SNA, all the service primitives has been shown without a TNSS-SNA- prefix e.g. the TNSS-SNA-ACTIVATE request is shortened into an ACTIVATE request.

4.2 SS-SNA services offered over the TNSS-SAP

NOTE: As man-machine interface or user applications are outside the scope of this standard service primitives are used to define information exchange to and from the standardized part of the MS/LS. Those primitives may be only indirectly accessible.

The SS-SNA service primitives at the served user MS/LS TNSS-SAP shall be:

- ASSIGN indication;
- INVOKE request;
- INVOKE FAILURE indication;
- SS SUPPORT INFO indication.

The SS-SNA service primitives at the authorized user MS/LS TNSS-SAP shall be:

- DEFINE request;
- DEFINE ACK indication;
- INTERROGATE request;
- INTERROGATE ACK indication.

The served user should have the possibility to use the INTERROGATE primitives mentioned above, limited to its own ITSI.

4.2.1 Void

4.2.2 Void

4.2.3 ASSIGN indication

The ASSIGN indication primitive shall be sent to the served user application by the MS/LS CMCE over TNSS-SAP to inform it about the definition of a short number (for that served user). It also possibly controls the acknowledgement of the reception of that information by the served user MS/LS.

When supported (since it is optional), the assignment process shall support one short number in a request. Optionally it may support a list or range of short numbers in a single request.

The ASSIGN indication primitive shall contain the SS-SNA parameters listed in table 1.

Table 1: Parameters for the primitive ASSIGN indication

Parameter	Indication
Short number(s)	M (note 1)
Short number definition(s)	M (note 2)
SS-COLP invocation	O (note 3)
SS-TPI invocation	O (notes 3 and 4)
Delivery of priority levels of talking/sending party speech/transmission requests	C (note 5)
Delivery of talking/sending party mnemonic name	C (note 5)
Overriding of SS-CAD invocation for incoming calls	O (note 3)
Overriding of SS-BIC invocation	O (notes 3 and 6)
Overriding of SS-CAD invocation for outgoing calls	O (note 3)
Overriding of SS-BOC invocation	O (notes 3 and 7)
Overriding of SS-CLIR invocation	O (note 3)
Acknowledgement requested from served user	O
NOTE 1: It is optional to define more than one short number in a single primitive ASSIGN indication.	
NOTE 2: There shall be as many short number definitions as there are short numbers.	
NOTE 3: May only be present in the case of new short number definition (i.e. not deletion of an existing definition), as part of that definition. If the primitive ASSIGN indication includes more than one short number, that parameter may thus be repeated with each.	
NOTE 4: That parameter may only be present when the short number corresponds to an ITSI (i.e. it shall then apply only for individual calls).	
NOTE 5: Conditional on the value of the element SS-TPI invocation corresponding to the invocation of SS-TPI (see note 4).	
NOTE 6: That parameter may only be present when the parameter overriding of SS-CAD invocation for incoming calls is not (since SS-CAD for incoming calls overrides SS-BIC).	
NOTE 7: That parameter may only be present when the parameter overriding of SS-CAD invocation for outgoing calls is not (since SS-CAD for outgoing calls overrides SS-BOC).	

When an acknowledgement is requested from the served user, it shall be sent by the served user MS/LS without involving the user application (i.e. directly); hence there is no ASSIGN ACK request primitive.

4.2.4 DEFINE request

The DEFINE request primitive shall be sent to the MS/LS CMCE by the authorized user application over TNSS-SAP to define a short number for a served user, plus possibly the control of specific supplementary services. It also possibly controls the assignment of that definition to the served user MS/LS, and if yes also the acknowledgement of the reception of that assignment by that MS/LS.

When supported (since it is optional), the definition process shall support one short number for one served user in a request. That served user shall always be an individual subscriber (i.e. not a group). Optionally the definition process may support a list or range of short numbers in a single request. Still optionally it may support a list or range of served users.

The DEFINE request primitive shall contain the SS-SNA parameters listed in table 2.

Table 2: Parameters for the primitive DEFINE request

Parameter	Request
Access priority	O
Served user(s)	M (note 1)
Short number(s)	M (note 2)
Short number definition(s)	M (note 3)
SS-COLP invocation	O (note 4)
SS-TPI invocation	O (note 5)
Delivery of priority levels of talking/sending party speech/transmission requests	C (note 6)
Delivery of talking/sending party mnemonic name	C (note 6)
Overriding of SS-CAD invocation for incoming calls	O (note 4)
Overriding of SS-BIC invocation	O (notes 4 and 7)
Overriding of SS-CAD invocation for outgoing calls	O (note 4)
Overriding of SS-BOC invocation	O (notes 4 and 8)
Overriding of SS-CLIR invocation	O (note 4)
Assignment to served user(s) requested	O (note 4)
Acknowledgement requested from served user(s)	O (note 9)
NOTE 1: It is optional to define one or more short numbers for more than one served user in a single primitive DEFINE request.	
NOTE 2: It is optional to define more than one short number in a single primitive DEFINE request.	
NOTE 3: There shall be as many restricted short number definitions as there are short numbers.	
NOTE 4: May only be present in the case of new short number definition (i.e. not deletion of an existing definition), as part of that definition. If the primitive DEFINE request includes more than one short number, that parameter may thus be repeated with each.	
NOTE 5: That parameter may only be present when the short number corresponds to an ITSI (i.e. it shall then apply only for individual calls).	
NOTE 6: Conditional on the value of the element SS-TPI invocation corresponding to the invocation of SS-TPI (see note 5).	
NOTE 7: That parameter may only be present when the parameter overriding of SS-CAD invocation for incoming calls is not (since SS-CAD for incoming calls overrides SS-BIC).	
NOTE 8: That parameter may only be present when the parameter overriding of SS-CAD invocation for outgoing calls is not (since SS-CAD for outgoing calls overrides SS-BOC).	
NOTE 9: Such acknowledgement may be requested only together with the assignment to served user(s).	

4.2.5 DEFINE ACK indication

The DEFINE ACK indication primitive shall be sent to the authorized user application by the MS/LS CMCE over TNSS-SAP to inform it of the result of a previous DEFINE request.

If the previous request has been addressed to a SwMI for more than one served user, that SwMI may send its corresponding response either in one single request which applies to all those served users or in multiple requests.

The DEFINE ACK indication primitive shall contain the SS-SNA parameters listed in table 3.

Table 3: Parameters for the primitive DEFINE ACK indication

Parameter	Indication
Definition result	M (note 1)
Served user(s)	M (note 2)
Short number(s)	C (notes 3 and 4)
SS-COLP invocation not accepted	O (note 5)
SS-TPI invocation not accepted	O (note 5)
SS-TPI invocation accepted but with no delivery of priority levels of talking/sending party speech/transmission requests	O (note 6)
SS-TPI invocation accepted but with no delivery of talking/sending party mnemonic name	O (note 6)
Overriding of SS-CAD invocation for incoming calls not accepted	O (note 5)
Overriding of SS-BIC invocation not accepted	O (note 5)
Overriding of SS-CAD invocation for outgoing calls not accepted	O (note 5)
Overriding of SS-BOC invocation not accepted	O (note 5)
Overriding of SS-CLIR invocation not accepted	O (note 5)
NOTE 1:	There shall be only one definition result per primitive DEFINE ACK indication if there are more than one served user or more than one short number.
NOTE 2:	It is optional to acknowledge the short number definitions for more than one served user in a single primitive DEFINE ACK indication.
NOTE 3:	Shall be present when the definition result is: either - positive; or - negative for some specific short number indicated by the corresponding parameter value.
NOTE 4:	It is optional to acknowledge the short number definitions of more than one short number in a single primitive DEFINE ACK indication.
NOTE 5:	That parameter should be present together with the related short number when: - the definition result is positive; and - the corresponding request has not been accepted by the infrastructure.
NOTE 6:	That parameter should be present together with the related short number when: - the definition result is positive; - the request to invoke SS-TPI alone (i.e. without that option) as part of the related short number definition has been accepted by the infrastructure; but - not with the corresponding subscription option.

4.2.6 INTERROGATE request

The INTERROGATE request primitive shall be sent to the MS/LS CMCE by the authorized user application over TNSS-SAP to know the definition of a short number for a served user, and whether that definition possibly controls the assignment of that definition to the served user MS/LS and if yes also the acknowledgement of the reception of that assignment by that MS/LS.

When supported (since it is optional), the interrogation process shall support one served user in a request. That served user shall always be an individual subscriber (i.e. not a group). Optionally the interrogation process may support the restriction of the interrogation to one short number or to a list or range of short numbers.

The INTERROGATE request primitive shall contain the SS-SNA parameters listed in table 4.

Table 4: Parameters for the primitive INTERROGATE request

Parameter	Request
Access priority	O
Served user	M (note)
Short number(s)	O
NOTE:	It is optional to place an interrogation about more than one served user in a single primitive INTERROGATE request.

4.2.7 INTERROGATE ACK indication

The INTERROGATE ACK indication primitive shall be sent to the authorized user application by the MS/LS CMCE over TNSS-SAP to inform it about the result of a previous INTERROGATE request.

If the previous request has been addressed to a SwMI for more than one served user, that SwMI may send its corresponding response either in one single request which applies to all those served users or in multiple requests.

The INTERROGATE ACK indication primitive shall contain the SS-SNA parameters listed in table 5.

Table 5: Parameters for the primitive INTERROGATE ACK indication

Parameter	Indication
Interrogation result	M (note 1)
Served user	M (note 2)
Short number(s)	M (note 3)
Short number definition(s)	M (note 4)
SS-COLP invocation	O (note 5)
SS-TPI invocation	O (notes 5 and 6)
Delivery of priority levels of talking/sending party speech/transmission requests	C (note 7)
Delivery of talking/sending party mnemonic name	C (note 7)
Overriding of SS-CAD invocation for incoming calls	O (note 5)
Overriding of SS-BIC invocation	O (notes 5 and 8)
Overriding of SS-CAD invocation for outgoing calls	O (note 5)
Overriding of SS-BOC invocation	O (notes 5 and 9)
Overriding of SS-CLIR invocation	O (note 5)
Assignment to served user requested	O
Acknowledgement requested from served user	O (note 10)
<p>NOTE 1: There shall be only one interrogation result per primitive INTERROGATE ACK indication if there are more than one interrogated TETRA identity or more than one short number.</p> <p>NOTE 2: It is optional to send the response to an interrogation about more than one served user in a single primitive INTERROGATE ACK indication.</p> <p>NOTE 3: Shall be present when the interrogation result is: either - positive; or - negative for some specific short number indicated by the corresponding parameter value. It is optional to send the response to an interrogation about more than one short number in a single primitive INTERROGATE ACK indication.</p> <p>NOTE 4: There shall be as many short number definitions as there are short numbers.</p> <p>NOTE 5: May only be present in the case of new short number definition (i.e. not deletion of an existing definition). If the primitive includes more than one short number, that parameter may thus be repeated with each.</p> <p>NOTE 6: That parameter may only be present when the short number corresponds to an ITSI (i.e. it shall then apply only for individual calls).</p> <p>NOTE 7: Conditional on the value of the element SS-TPI invocation corresponding to the invocation of SS-TPI (see note 6).</p> <p>NOTE 8: That parameter may only be present when the parameter overriding of SS-CAD invocation for incoming calls is not (since SS-CAD for incoming calls overrides SS-BIC).</p> <p>NOTE 9: That parameter may only be present when the parameter overriding of SS-CAD invocation for outgoing calls is not (since SS-CAD for outgoing calls overrides SS-BOC).</p> <p>NOTE 10: Such acknowledgement may have been requested only together with the assignment to served user.</p>	

4.2.8 INVOKE request

The INVOKE request primitive shall be sent to the MS/LS CMCE by the served user application over TNSS-SAP to invoke SS-SNA.

It shall contain the SS-SNA parameter given in table 6.

Table 6: Parameter for the primitive INVOKE request

Parameter	Request
Short number	M

NOTE: There is no access priority parameter in table 6 since the access priority of that primitive is the same as that of the concurrent TNSS-SETUP request.

4.2.9 INVOKE FAILURE indication

The INVOKE FAILURE indication primitive shall be sent to the served user application by the MS/LS CMCE over TNSS-SAP to inform that application about the failure of SS-SNA invocation.

It shall contain the SS-SNA parameter given in table 7.

Table 7: Parameter for the primitive INVOKE FAILURE indication

Parameters	Indication
Invocation failure cause	M

4.2.10 SS SUPPORT INFO indication

The SS SUPPORT INFO indication primitive may be sent to the served user application by the MS/LS CMCE over TNSS-SAP when the definition of at least one short number for the served user is such that if that user invokes SS-SNA using that short number, such invocation would at the same time:

- invoke SS-COLP or SS-TPI while the served user (visited) SwMI does not support the supplementary service;
- invoke SS-TPI with a subscription option while the served user (visited) SwMI does not support such option; or
- request the overriding of SS-CAD for outgoing calls or of SS-BOC while the served user (visited) SwMI would not accept that request.

The SS SUPPORT INFO indication primitive shall contain the SS-SNA parameters listed in table 8.

Table 8: Parameters for the primitive SS SUPPORT INFO indication

Parameter	Indication (note)
SS-COLP not supported	O
SS-TPI not supported	O
SS-TPI supported but with no delivery of talking/sending party mnemonic name	O
SS-TPI supported but with no delivery of priority levels of talking/sending party speech/transmission requests	O
Overriding of SS-CAD invocation for outgoing calls not accepted	O
Overriding of SS-BOC invocation not accepted	O
NOTE: At least one element shall be included in the SS SUPPORT INFO request/indication information flow.	

4.3 Parameter description

Access priority:

- low priority;
- high priority;
- emergency priority.

The default value for that parameter shall be low priority. The value emergency priority should not be used for that parameter in any primitive.

Acknowledgement requested from served user(s): acknowledgement of assignment of short number definitions to served user(s) requested from that(those) user(s).

Assignment to served user(s) requested: (air interface) downloading of short number definitions requested to be made to served user(s).

Assignment result:

- successful request;
- unsuccessful request.

Definition result:

- successful request;
- unsuccessful request.

- If the request has been unsuccessful, one of the following reasons shall be indicated:
 - rejected for any reason;
 - not an authorized user;
 - supplementary service not subscribed for the user addressed;
 - unknown TETRA identity;
 - repetition of parameters not supported;
 - protocol problem.

Interrogation result:

- successful request;
- unsuccessful request.

- If the INTERROGATE request has been unsuccessful, one of the following reasons shall be indicated:
 - rejected for any reason;
 - not an authorized user;
 - unknown TETRA identity;
 - repetition of parameters not supported;
 - protocol problem.

Invocation failure cause:

- not subscribed;
- not defined;
- not supported.

- Those failure causes are sent by the infrastructure (more precisely, by the originating SwMI) to inform the calling user who has invoked SS-SNA that his invocation has failed for one of the following reasons:
 - for the failure cause not subscribed: SS-SNA has not been subscribed to for that user;
 - for the failure cause not defined: the calling user has invoked SS-SNA in using a short number which is not defined (in the originating SwMI);
 - for the failure cause not supported: the originating SwMI does not support SS-SNA.

NOTE: Each of the three above values being mutually exclusive of the two others, there is no need to repeat the parameter invocation failure cause in the INVOKE FAILURE indication primitive.

Overriding of SS-BIC invocation: if part of a short number definition, when the served user invokes SS-SNA using that short number, the possible invocation of SS-BIC against the called user/group corresponding to that short number shall be overridden.

Overriding of SS-BIC invocation not accepted: the corresponding request has not been accepted by the infrastructure as part of the definition of the related short number.

Overriding of SS-BOC invocation: if part of a short number definition, when the served user invokes SS-SNA using that short number while being registered in his home SwMI, the possible invocation of SS-BOC (against the calling user) shall be overridden.

Overriding of SS-BOC invocation not accepted:

- in the primitive DEFINE ACK indication, means that the corresponding request has not been accepted by the served user home SwMI as part of the definition of the related short number;
- in the primitive SS SUPPORT INFO indication, means that the served user visited SwMI will not accept any request to overriding SS-BOC invocation when that user invokes SS-SNA using a short number defined as including such request.

Overriding of SS-CAD invocation for incoming calls: if part of a short number definition, when the served user invokes SS-SNA using that short number, the possible invocation of SS-CAD for incoming calls to the called user/group corresponding to that short number shall be overridden.

Overriding of SS-CAD invocation for incoming calls not accepted: the corresponding request has not been accepted by the infrastructure as part of the definition of the related short number.

Overriding of SS-CAD invocation for outgoing calls: if part of a short number definition, when the served user invokes SS-SNA using that short number while being registered in his home SwMI, the possible invocation of SS-CAD invocation for outgoing calls (from the calling user) shall be overridden.

Overriding of SS-CAD invocation for outgoing calls not accepted:

- in the primitive DEFINE ACK indication, means that the corresponding request has not been accepted by the served user home SwMI as part of the definition of the related short number;
- in the primitive SS SUPPORT INFO indication, means that the served user visited SwMI will not accept any request to overriding SS-BOC invocation when that user invokes SS-SNA using a short number defined as including such request.

Overriding of SS-CLIR invocation: if part of a short number definition, when the served user invokes SS-SNA using that short number, the possible automatic invocation of SS-CLIR for the calling user shall be overridden.

Overriding of SS-CLIR invocation not accepted: the corresponding request has not been accepted by the served user home SwMI as part of the definition of the related short number.

Served user:

- short number address;
- Short Subscriber Identity (SSI);
- Short Subscriber Identity (SSI) + Address extension.

The short number address shall be valid only in requests.

Short number definition:

- GTSI, in the case where the short number is defined as corresponding to a group, or ITSI, where the short number is defined as corresponding to an individual subscriber group or a gateway;
- in addition, external subscriber number in the case of a gateway.

Short number: any number from 1 to 15 (in the basic primitive).

SS-COLP invocation: if part of a short number definition, when the served user invokes SS-SNA using that short number while being registered in his home SwMI, SS-COLP shall also be invoked, even if it had not been subscribed to for the calling user.

SS-COLP invocation not accepted: the corresponding request has not been accepted by the served user home SwMI as part of the definition of the related short number.

SS-TPI invocation: if part of a short number definition, when the served user invokes SS-SNA using that short number while being registered in his home SwMI, SS-TPI shall also be invoked, even if it had not been subscribed to for the calling user.

Delivery of priority levels of talking/sending party speech/transmission requests: associated to the parameter SS-TPI invocation, indicates whether or not SS-TPI is to be invoked with that option.

Delivery of talking/sending party mnemonic name: associated to the parameter SS-TPI invocation, indicates whether or not SS-TPI is to be invoked with that option.

SS-TPI invocation not accepted: the corresponding request has not been accepted by the served user home SwMI as part of the definition of the related short number.

SS-TPI invocation accepted but with no delivery of priority levels of talking/sending party speech/transmission requests: the request that SS-TPI be invoked when the served user invokes SS-SNA using the related short number has been accepted by the served user home SwMI as part of the definition of the related short number but not the subscription option delivery of priority levels of talking/sending party speech/transmission requests.

SS-TPI invocation accepted but with no delivery of talking/sending party mnemonic name: the request that SS-TPI be invoked when the served user invokes SS-SNA using the related short number has been accepted by the served user home SwMI as part of the definition of the related short number but not the subscription option delivery of talking/sending party mnemonic name.

SS-COLP not supported: indicates that the supplementary service Connected Line Identification Presentation is not supported by the served user visited SwMI.

SS-TPI not supported: indicates that the supplementary service Talking Party Identification is not supported by the served user SwMI.

SS-TPI supported but with no delivery of talking/sending party mnemonic name: indicates that the supplementary service Talking Party Identification is supported by the served user visited SwMI but not the subscription option delivery of talking/sending party mnemonic name.

SS-TPI supported but with no delivery of priority levels of talking/sending party speech/transmission requests: indicates that the supplementary service Talking Party Identification is supported by the served user visited SwMI but not the subscription option delivery of priority levels of talking/sending party speech/transmission requests.

5 Signalling protocol for the support of SS-SNA

5.1 SS-SNA operational requirements

5.1.1 Served user MS/LS

The served user MS/LS shall comply with the requirements in clause 14 of ETS 300 392-2 [2] which apply to the tele- and bearer services which it supports. In addition, it shall comply with the relevant call related requirements in clause 7 of ETS 300 392-9 [7].

If it supports the assignment procedure, the served user MS/LS shall comply with the relevant call unrelated requirements in clauses 7 and 11 of ETS 300 392-9 [7].

5.1.2 Served user SwMI

That SwMI shall support as originating SwMI the served user MS/LS complying with the requirements for individual and group calls set in subclause 5.1.1. It shall also comply with the relevant call related requirements in clause 7 of ETS 300 392-9 [7].

If the call is over the ISI, the served user SwMI shall comply with the corresponding ISI requirements, set in ETS 300 392-3-2 [4], for individual calls and in ETS 300 392-3-3 [5], for group calls.

If it supports the assignment procedure, that SwMI shall comply with the relevant call unrelated requirements in clauses 7 to 11 of ETS 300 392-9 [7].

5.1.3 Authorized user MS/LS

The authorized user MS/LS shall comply with the call unrelated procedures defined in clause 14 of ETS 300 392-2 [2], especially in its subclause 14.5.4, and in clauses 7 and 11 of ETS 300 392-9 [7].

5.1.4 Authorized user SwMI

That SwMI shall support the authorized user MS/LS complying with subclause 5.1.3.

If the authorized user SwMI is different from the home SwMI of the managed user/group, it shall comply with the relevant call unrelated requirements in clauses 9 to 11 of ETS 300 392-9 [7].

5.1.5 Served user home SwMI

The managed user/group home SwMI shall comply with the relevant call unrelated requirements in clauses 9 to 11 of ETS 300 392-9 [7].

5.2 Coding requirements

The information contained in the following description tables corresponds to the following keys:

- **Length:** length of the information element or sub-element in bits;
- **Type:** element type (1, 2, 3) described in subclause 14.7 of ETS 300 392-2 [2];
- **C/O/M:** conditional/optional/mandatory information in the PDU;
- **Remark:** comment or reference to note(s).

5.2.1 SS-SNA PDUs

5.2.1.1 ASSIGN PDU

ASSIGN PDU may be sent to the served user MS/LS in the SwMI where that user is registered, so that that MS/LS may store the definitions corresponding to short numbers made for that user.

ASSIGN PDU shall contain the SS-SNA information elements listed in table 9.

Table 9: ASSIGN PDU contents

Information element	Length	Type	C/O/M	Remark
SS-type	6	1	M	Defined in ETS 300 392-9 [7]
SNA PDU type	5	1	M	ASSIGN
Range type for short number(s)	4	1	M	Note 1
Short number	8	1	M	Note 2
Address type of short number definition	3	1	M	Notes 2 and 3
SSI corresponding to short number	24	1	C	Note 4
Extension corresponding to short number	24	1	C	Note 4
External number length indicator	5	1	C	Notes 4 and 5
External subscriber number	variable	1	C	Note 6
Other supplementary service invocation/invocation overriding	7	1	C	Note 7
SS-TPI subscription option(s)	2	1	C	Note 8
Acknowledgement requested	1	1	M	Note 9
Limitations on other supplementary service invocations/invocation overridings	6	2	O	Note 10
NOTE 1:	The value of that information element shall always be different from 0; the support of a value of that information element larger than 1 is optional.			
NOTE 2:	This information element shall be considered as part of a set which shall be repeated as defined by the range type for short number(s).			
NOTE 3:	This information element shall take the binary value 111 ₂ when the previous definition of the short number to which it is associated is being deleted by the present PDU.			
NOTE 4:	Shall be selected as defined by the information element address type of short number definition.			
NOTE 5:	This information element can only be present when the value of the information element address type of short number definition indicates that the short number to which it is associated is defined as corresponding to an external subscriber number. Its value shall then be equal to N, N being the number of digits of that external subscriber number (necessarily different from 0).			
NOTE 6:	The length in digits of the information element external subscriber number digits shall be as defined by the information element external number length indicator (see note 5), i.e. this information element shall be conditional on the value of N.			
NOTE 7:	Shall be present whenever the value of the information element address type of short number definition does not correspond to the command to delete the existing definition for the short number (see table 17). It shall then be repeated together with that information element.			
NOTE 8:	Shall be conditional on the binary value of the information element other supplementary service invocation/invocation overriding being larger than or equal to 100000 ₂ (i.e. corresponding to SS-TPI being invoked when the calling user invokes SS-SNA using the related short number).			
NOTE 9:	If the information element short number is repeated, the information element acknowledgement requested shall apply to all the corresponding short number values in the present PDU.			
NOTE 10:	The information element limitations on other supplementary service invocations/invocation overridings should be present when the definition of at least one short number which is sent in the present ASSIGN PDU is such that if the served user invokes SS-SNA using that short number, such invocation would at the same time: <ul style="list-style-type: none"> - invoke SS-COLP or SS-TPI while the served user (visited) SwMI does not support the supplementary service; - invoke of SS-TPI with a subscription option while the served user (visited) SwMI does not support such option; or - request the overriding of SS-CAD for outgoing calls or of SS-BOC while the served user (visited) SwMI would not accept that request. 			

5.2.1.2 ASSIGN ACK PDU

ASSIGN ACK PDU is sent by the served user MS/LS or by the MS/LSs of group members as an acknowledgement of reception of a previous ASSIGN PDU.

NOTE: Clearly the ASSIGN ACK PDU will be sent by the LSs of group members only in the group home SwMI.

ASSIGN ACK PDU shall contain the SS-SNA information elements listed in table 10.

Table 10: ASSIGN ACK PDU contents

Information element	Length	Type	C/O/M	Remark
SS-type	6	1	M	Defined in ETS 300 392-9 [7]
SNA PDU type	5	1	M	ASSIGN ACK
Assignment result	1	1	M	
Range type for short number(s)	4	1	M	Note 1
Short number	8	1	M	Note 2
NOTE 1:	The value of that information element shall always be different from 0; the support of a value of that information element larger than 1 is optional.			
NOTE 2:	This information element shall be considered as part of a set which shall be repeated as defined by the range type for short number(s).			

NOTE: A one-to-one correspondence between the contents of ASSIGN PDUs and ASSIGN ACK PDUs is not required, i.e.:

- one single ASSIGN ACK PDU may be sent to acknowledge more than one ASSIGN ACK PDU; or
- more than one ASSIGN ACK PDU may be sent to acknowledge one single ASSIGN ACK PDU.

5.2.1.3 DEFINE PDU

DEFINE PDU may be sent by the authorized user to the home SwMI of the served user.

The authorized user expects at least one DEFINE ACK PDU as a confirmation.

DEFINE PDU shall contain the SS-SNA information elements listed in table 11, where the inclusion of at least one served user and one short number definition for that user is mandatory (as part of the optional DEFINE PDU), but that of the list or range of served users and/or of short numbers is optional.

Table 11: DEFINE PDU contents

Information element	Length	Type	C/O/M	Remark
SS-type	6	1	M	Defined in ETS 300 392-9 [7]
SNA PDU type	5	1	M	DEFINE
Range type for served user(s)	4	1	M	Note 1
Address type of served user	2	1	M	Note 2
Served user short number address	8	1	C	Notes 2 and 3
Served user SSI	24	1	C	Notes 2 and 3
Served user extension	24	1	C	Notes 2 and 3
Range type for short number(s)	4	1	M	Note 1
Short number	8	1	M	Note 4
Address type of short number definition	3	1	M	Notes 4 and 5
SSI corresponding to short number	24	1	C	Note 6
Extension corresponding to short number	24	1	C	Note 6
External number length indicator	5	1	C	Notes 6 and 7
External subscriber number	variable	1	C	Note 8
Other supplementary service invocation/invocation overriding	7	1	C	Note 9
SS-TPI subscription option(s)	2	1	C	Note 10
Assignment requested	1	1	M	Note 11
Acknowledgement requested	1	1	C	Note 12
NOTE 1:	The value of that information element shall always be different from 0; the support of a value of that information element larger than 1 is optional.			
NOTE 2:	This information element shall be considered as part of a set which shall be repeated as defined by the range type for served user(s).			
NOTE 3:	Shall be selected as defined by the information element address type of served user.			
NOTE 4:	This information element shall be considered as part of a set which shall be repeated as defined by the range type for short number(s).			
NOTE 5:	This information element shall take the binary value 111 ₂ when the previous definition of the short number to which it is associated is being deleted by the present PDU.			
NOTE 6:	Shall be selected as defined by the information element address type of short number definition.			
NOTE 7:	This information element can only be present when the value of the information element address type of short number definition indicates that the short number to which it is associated is defined as corresponding to an external subscriber number. Its value shall then be equal to N, N being the number of digits of that external subscriber number (necessarily different from 0).			
NOTE 8:	The length in digits of the information element external subscriber number digits shall be as defined by the information element external number length indicator (see note 7), i.e. this information element shall be conditional on the value of N.			
NOTE 9:	Shall be present whenever the value of the information element address type of short number definition does not correspond to the command to delete the existing definition for the short number (see table 17). It shall then be repeated together with that information element.			
NOTE 10:	Shall be conditional on the binary value of the information element other supplementary service invocation/invocation overriding being larger than or equal to 100000 ₂ (i.e. corresponding to SS-TPI being invoked when the calling user invokes SS-SNA using the related short number).			
NOTE 11:	If the information elements served user and or short number are repeated, the information element assignment requested shall apply to all the corresponding served users and/or short numbers in the present PDU.			
NOTE 12:	Shall be conditional on the value of the information element assignment requested being equal to 1.			

NOTE: In practice, there will no need to indicate the served user identity using his ITSI (i.e. by complementing its SSI with its MNI) in the DEFINE PDU, since that PDU will always be sent to the home SwMI of the served user(s).

5.2.1.4 DEFINE ACK PDU

DEFINE ACK PDU may be sent by the home SwMI of the party/parties for which SS-SNA definition has been previously requested (by a DEFINE PDU).

In case a DEFINE PDU was sent for more than one user (i.e. it included either a list or a range of identities), subclause 8.3.2 of ETS 300 392-9 [7] shall apply to the corresponding DEFINE ACK PDU.

DEFINE ACK PDU shall contain the SS-SNA information elements listed in table 12.

Table 12: DEFINE ACK PDU contents

Information element	Length	Type	C/O/M	Remark
SS-type	6	1	M	Defined in ETS 300 392-9 [7]
SNA PDU type	5	1	M	DEFINE ACK
Range type for served user(s)	4	1	M	Note 1
Address type of served user	2	1	M	Note 2
Served user SSI	24	1	C	Notes 2 and 3
Served user extension	24	1	C	Notes 2 and 3
Multiple served user mask present	1	1	M	
Multiple served user mask	variable	1	C	Note 4
Definition result	1	1	M	Note 5
Range type for short number(s)	4	1	M	Note 6
Short number	8	1	C	Note 7
Multiple short number mask present	1	1	M	
Multiple short number mask	variable	1	C	Note 8
Definition failure cause	3	1	C	Note 9
Rejection of other supplementary service control	9	2	O	Note 10
NOTE 1:	The value of that information element shall always be different from 0; the support of a value of that information element larger than 1 is optional.			
NOTE 2:	This information element shall be considered as part of a set which shall be repeated as defined by the range type for served user(s).			
NOTE 3:	According to subclause 8.4.1 of ETS 300 392-9 [7], the information element address type of served user shall indicate that the information element served user extension shall be present whenever the MNI of the authorized user is different from that of the served user.			
NOTE 4:	Shall be conditional on the value of the information element multiple user mask present being equal to 1.			
NOTE 5:	If the information elements served user and/or short number are repeated, the information element definition result shall apply to all the corresponding served users and/or short numbers for which the present PDU applies (i.e. in the case of short numbers: list of range of short numbers, possibly screened by the multiple short number mask).			
NOTE 6:	The value of that information element shall be different from 0 when the definition result is either: - positive; or - negative for some specific short number indicated by the following information element. The support of a value of that information element larger than 1 is optional.			
NOTE 7:	This information element shall be considered as part of a set which shall be repeated as defined by the range type for short number(s).			
NOTE 8:	Shall be conditional on the value of the information element multiple short number mask present being equal to 1.			
NOTE 9:	Shall be conditional on the value of the information element definition result being equal to 0.			
NOTE 10:	The information element rejection of other supplementary service control should be present when: - the value of the information element definition result in that PDU is equal to 1; and - some change(s) have been made in the corresponding (successful) short number definition compared to the definition requested regarding the invocation or invocation overriding of other supplementary services together with each short number. It shall then be repeated with each corresponding short number in that PDU. The specific invocation(s) or invocation overriding(s) of other supplementary services which could not be accepted by the served user home SwMI as part of short number definition(s) are given by the value of the information element rejection of other supplementary service control (see table 24).			

5.2.1.5 INTERROGATE PDU

INTERROGATE PDU may be sent by the authorized user to the home SwMI of the served user.

The authorized user expects at least one INTERROGATE ACK PDU as a response.

INTERROGATE PDU shall contain the SS-SNA information elements listed in table 13.

Table 13: INTERROGATE PDU contents

Information element	Length	Type	C/O/M	Remark
SS-type	6	1	M	Defined in ETS 300 392-9 [7]
SNA PDU type	5	1	M	INTERROGATE
Address type of served user	2	1	M	
Served user short number address	8	1	C	Note 1
Served user SSI	24	1	C	Note 1
Served user extension	24	1	C	Note 1
Range type for short number(s)	4	1	M	Note 2
Short number	8	1	C	Note 3
NOTE 1:	Shall be selected as defined by the information element address type of served user.			
NOTE 2:	The value of that information element may be equal to 0: this shall mean that the interrogation is for all short numbers defined for the served user. The support of a value of that information element larger than 1 is optional.			
NOTE 3:	This information element shall be considered as part of a set which shall be repeated as defined by the range type for short number(s).			

NOTE: In practice, there will no need to indicate the served user identity using its ITSI (i.e. by complementing its SSI with its MNI) in the INTERROGATE PDU, since that PDU will always be sent to the home SwMI of the served user.

5.2.1.6 INTERROGATE ACK PDU

INTERROGATE ACK PDU is sent by the home SwMI of the served user on which a SS-SNA interrogation has been previously made (by an INTERROGATE PDU).

INTERROGATE ACK PDU shall contain the SS-SNA information elements listed in table 14.

In case an INTERROGATE PDU was sent to know the definitions of more than one short number, subclause 8.3.2 of ETS 300 392-9 [7] shall apply to the corresponding INTERROGATE ACK PDU.

Table 14: INTERROGATE ACK PDU contents

Information element	Length	Type	C/O/M	Remark
SS-Type	6	1	M	Defined in ETS 300 392-9 [7]
SNA PDU type	5	1	M	INTERROGATE ACK
Address type of served user	2	1	M	Note 1
Served user SSI	24	1	C	
Served user extension	24	1	C	Note 1
Interrogation result	1	1	M	Note 2
Range type for short number(s)	4	1	M	Note 3
Short number	8	1	M	Note 4
Multiple short number mask present	1	1	M	
Multiple short number mask	variable	1	C	Note 5
Address type of short number definition	3	1	M	Notes 6 and 7
SSI corresponding to short number	24	1	C	Note 8
Extension corresponding to short number	24	1	C	Note 8
External number length indicator	5	1	C	Notes 8 and 9
External subscriber number	variable	1	C	Note 10
Other supplementary service invocation/invocation overriding	7	1	C	Note 11
SS-TPI subscription option(s)	2	1	C	Note 12
Assignment requested	1	1	C	Note 13
Acknowledgement requested	1	1	C	Note 14
Interrogation failure cause	3	1	C	Note 15
NOTE 1:	According to subclause 8.4.1 of ETS 300 392-9 [7], the information element address type of served user shall indicate that the information element served user extension shall be present whenever the MNI of the authorized user is different from that of the interrogated party.			
NOTE 2:	If the information element short number is repeated, the information element interrogation result shall apply to all the corresponding short numbers for which the present PDU applies (i.e. in the case of short numbers: list of range of short numbers, possibly screened by the multiple short number mask).			
NOTE 3:	The value of that information element shall be different from 0 when the interrogation result is: either - positive; or - negative for some specific short number indicated by the following information element. The support of a value of that information element larger than 1 is optional.			
NOTE 4:	This information element shall be considered as part of a set which shall be repeated as defined by the range type for short number(s).			
NOTE 5:	Shall be conditional on the value of the information element multiple short number mask present being equal to 1.			
NOTE 6:	Shall be conditional on the value of the information element interrogation result element value being equal to 1. If present, shall be repeated as defined by the information element range type for short number(s) modified by the information element multiple short number mask if the latter is present. If the latter is not present, note 4 shall apply.			
NOTE 7:	This information element shall take the binary value 111 ₂ when the short number to which it is associated is not defined.			
NOTE 8:	Shall be selected as defined by the information element address type of short number definition.			
NOTE 9:	This information element can only be present when the value of the information element address type of short number definition indicates that the short number to which it is associated is defined as corresponding to an external subscriber number. Its value shall then be equal to N, N being the number of digits of that external subscriber number (necessarily different from 0).			
NOTE 10:	The length in digits of the information element external subscriber number shall be as defined by the information element external number length indicator (see note 9), i.e. this information element shall be conditional on the value of N.			

NOTE 11:	Shall be present whenever the value of the information element address type of short number definition does not correspond to the command to delete the existing definition for the short number (see table 17). It shall then be repeated together with that information element.
NOTE 12:	Shall be conditional on the binary value of the information element other supplementary service invocation/invocation overriding being larger than or equal to 1000000 ₂ (i.e. corresponding to SS-TPI being invoked when the calling user invokes SS-SNA using the related short number).
NOTE 13:	Shall be conditional on the value of the information element interrogation result being equal to 1. If the information element short number is repeated, the information element assignment requested shall apply to all the corresponding short numbers for which the present PDU applies (i.e. list of range of short numbers, possibly screened by the multiple short number mask).
NOTE 14:	Shall be conditional on the value of the information element assignment requested being equal to 1.
NOTE 15:	Shall be conditional on the value of the information element interrogation result being equal to 0.

5.2.1.7 SS SUPPORT INFO PDU

SS SUPPORT INFO PDU should be sent to the served user MS/LS in a visited SwMI, when at least one of his short number definitions is such that if the served user invokes SS-SNA using that short number, such invocation would at the same time:

- invoke SS-COLP or SS-TPI while the served user (visited) SwMI does not support the supplementary service;
- invoke of SS-TPI with a subscription option while the served user (visited) SwMI does not support such option; or
- request the overriding of SS-CAD for outgoing calls or of SS-BOC while the served user (visited) SwMI would not accept that request.

The SS SUPPORT INFO PDU should not be sent twice to the served user by his visited SwMI, neither should it be sent if its information contents has not already been included in a previous ASSIGN PDU.

SS SUPPORT INFO PDU shall contain the SS-SNA information elements listed in table 15.

Table 15: SS SUPPORT INFO PDU contents

Information element	Length	Type	C/O/M	Remark
SS-Type	6	1	M	Defined in ETS 300 392-9 [7]
SNA PDU type	5	1	M	SS SUPPORT INFO
Limitations on other supplementary service invocations/invocation overriding	6	1	M	

5.2.2 TETRA PDU information element and sub-element coding

5.2.2.1 Acknowledgement requested

Acknowledgement requested shall indicate whether the short number definition is to be or has been downloaded to the served user MS/LS, as defined in table 16.

Table 16: Acknowledgement requested information element contents

Information element	Length	Value	Remark
Acknowledgement requested	1	0	Acknowledgement not requested from served user
		1	Acknowledgement requested from served user

5.2.2.2 Address type of served user

The information element address type of served user shall indicate if the type of address which follows in the PDU is a (SS-SNA) short number address, a SSI or a full ITSI, as defined in table 12 of ETS 300 392-9 [7].

NOTE: A single information element address type of served user has been defined in the standard for the sake of simplicity. However the definition of some PDUs, in subclause 5.2.1, is such that some values of that information element will not be used in those PDUs (e.g. the value 0 in all ACK PDUs, since no information element served user short number address has been included in any of those PDUs).

5.2.2.3 Address type of short number definition

The information element address type of short number indicates either the type of address which follows in the PDU or the deletion of the previous definition of that short number. The possible types of address are:

- SSI (only) with no external subscriber number;
- full ITSI with no external subscriber number;
- SSI (only) with external subscriber number; or
- full ITSI with external subscriber number.

The information element address type of short number shall be encoded as defined in table 17.

Table 17: Address type of short number definition information element contents

Information element	Length	Value	Remark
Address type of short number definition	3	000 ₂	SSI (only) with no external subscriber number
		001 ₂	Full ITSI with no external subscriber number
		010 ₂	SSI (only) with external subscriber number (note)
		011 ₂	Full ITSI with external subscriber number (note)
		100 ₂	Reserved
		101 ₂	Reserved
		110 ₂	Reserved
		111 ₂	Deletion of short number definition
NOTE:	The corresponding SSI value (whether alone or part of the full ITSI) should then be as defined in subclauses 7.8, 7.9 and 7.10 of ETR 300-5 [10].		

5.2.2.4 Assignment requested

Assignment requested may be included in the DEFINE PDU, in the SS-SNA profile information element or in the INTERROGATE ACK PDU (see tables 11, 28 and 14 respectively). When included in the DEFINE PDU or in the SS-SNA profile information element, it shall indicate that the short number definition is to be downloaded to the served user MS/LS. When included in the INTERROGATE ACK PDU it shall indicate that such downloading has been requested earlier (e.g. in the DEFINE PDU).

It shall be encoded as defined in table 18.

Table 18: Assignment requested information element contents

Information element	Length	Value	Remark
Assignment requested	1	0	Assignment to served user not requested
		1	Assignment to served user requested

5.2.2.5 Assignment result

Assignment result shall indicate whether the previous request for assignment has been successful or unsuccessful as defined in table 19.

Table 19: Assignment result information element contents

Information element	Length	Value	Remark
Assignment result	1	0	Assignment unsuccessful
		1	Assignment successful

5.2.2.6 Definition failure cause

See table 20 of ETS 300 392-9 [7].

5.2.2.7 Definition result

Definition result shall indicate whether the previous request for definition has been successful or unsuccessful as defined in table 20.

Table 20: Definition result information element contents

Information element	Length	Value	Remark
Definition result	1	0	Definition unsuccessful
		1	Definition successful

5.2.2.8 Extension corresponding to short number

The extension corresponding to short number indicates the extended part of the TSI (i.e. the MNI) defined against the related short number. That information element will be used as called party extension by the originating SwMI when the served user has invoked SS-SNA in a SETUP PDU with the value of that short number. It shall be encoded as defined in table 11 of ETS 300 392-9 [7].

5.2.2.9 External number length indicator

See table 17 of ETS 300 392-9 [7], with the restriction that due to the way that information element is used in this ETS, its value shall never be equal to 0.

NOTE: Actually, the external number length indicator is not an information element per se, but it is needed according to the PDU encoding rules defined in subclause 14.7 of ETS 300 392-2 [2], for encoding the external subscriber number (the length of which is variable) as "a type 1 element".

5.2.2.10 External subscriber number

See subclause 14.8.20 of ETS 300 392-2 [2].

5.2.2.11 Interrogation failure cause

See table 20 of ETS 300 392-9 [7].

5.2.2.12 Interrogation result

Interrogation result shall indicate whether the previous request for interrogation has been successful or unsuccessful as defined in table 21.

Table 21: Interrogation result information element contents

Information element	Length	Value	Remark
Interrogation result	1	0	Interrogation unsuccessful
		1	Interrogation successful

5.2.2.13 Limitations on other supplementary service invocations/invocation overridings

The information element limitations on other supplementary service invocations/invocation overridings shall indicate which supplementary services would not be controlled according to the definition of at least one served user short number, if used by the served user to invoke SS-SNA.

The information element limitations on other supplementary service invocations/invocation overridings shall be encoded as defined in table 22.

Table 22: Limitations on other supplementary service invocations/invocation overridings information element contents

Information element	Length	Values (note)	Remark
Limitations on other supplementary service invocations/invocation overridings	6	xxxxx0 ₂	SS-COLP not supported
		xxxx0x ₂	Overriding of SS-CAD invocation for outgoing calls not accepted
		xxx0xx ₂	Overriding of SS-BOC invocation not accepted
		xx0xxx ₂	SS-TPI not supported
		x01xxx ₂	SS-TPI supported but with no delivery of priority levels of talking/sending party speech/transmission requests
		0x1xxx ₂	SS-TPI supported but with no delivery of talking/sending party mnemonic name
NOTE: The letter x in the values in that column stands for 0 or 1 indifferently.			

5.2.2.14 Multiple short number/served user mask and multiple short number/served user mask present

See subclause 8.3.2 of ETS 300 392-9 [7].

5.2.2.15 Other supplementary service invocation/invocation overriding

The information element other supplementary service invocation/invocation overriding is defined as a bit-mapped field where each bit corresponds to the control of a specific supplementary service by the related short number: when SS-SNA is invoked to establish a call using that short number, some of those specific supplementary services are invoked simultaneously for that call, and the others which would have normally been normally invoked are not.

The information element other supplementary service invocation/invocation overriding shall be encoded as defined in table 23.

Table 23: Other supplementary service invocation/invocation overriding information element contents

Information element	Length	Values (note 1)	Remark
Other supplementary service invocation/invocation overriding	7	xxxxxx1 ₂	Simultaneous SS-COLP invocation
		xxxxx1x ₂	Overriding of SS-CAD invocation for incoming calls
		xxxx10x ₂	Overriding of SS-BIC invocation (note 2)
		xxx1xxx ₂	Overriding of SS-CAD invocation for outgoing calls
		xx10xxx ₂	Overriding of SS-BOC invocation (note 3)
		x1xxxxx ₂	Overriding of SS-CLIR invocation (note 4)
		1xxxxxx ₂	Simultaneous SS-TPI invocation (note 5)
NOTE 1:	The letter x in the values in that column stands for 0 or 1 indifferently.		
NOTE 2:	Since the overriding of SS-CAD invocation for incoming calls overrides at the same time SS-BIC invocation (since SS-CAD for incoming calls overrides SS-BIC), the binary values xxx11x ₂ shall correspond to the overriding of SS-CAD invocation for incoming calls and not to the overriding of SS-BIC invocation.		
NOTE 3:	Since the overriding of SS-CAD invocation for outgoing calls overrides at the same time SS-BOC invocation (since SS-CAD for outgoing calls overrides SS-BOC), the binary values xx11xxx ₂ shall correspond to the overriding of SS-CAD invocation for outgoing calls and not to the overriding of SS-BOC invocation.		
NOTE 4:	Shall apply for the calls made using the related SS-SNA short number, in case SS-CLIR would otherwise have automatically been invoked for the served user.		
NOTE 5:	The information element other supplementary service invocation/invocation overriding may take such values only when the related short number corresponds to an ITSI (i.e. it shall then apply only for individual calls).		

5.2.2.16 Range type for short number(s) or for served user(s)

The generic definition of the information element range type (followed by the indication of the use of the specific range type) in subclause 8.3.1 of ETS 300 392-9 [7] applies, with the restriction that due to the way that information element is used in this ETS, its value shall never be equal to 0. It indicates whether the set of information elements which follow the information element range type in the PDU definition is present only once in the PDU received or if it is repeated (as a list, else as a range).

5.2.2.17 Rejection of other supplementary service control

The information element rejection of other supplementary service control indicates that the served user home SwMI has modified the request to define a short number which if accepted would have resulted in:

- the invocation of SS-COLP or SS-TPI while the served user home SwMI would not accept such request (e.g. because it does not support the supplementary service);
- the invocation of SS-TPI with a subscription option while the served user home SwMI would not accept such request (e.g. it does not support such option); or
- the request to override some supplementary service (e.g. SS-CAD or SS-BOC) and such overriding would not be accepted by the served user home SwMI or by the called user/group home SwMI.

The information element rejection of other supplementary service control shall be encoded as defined in table 24.

Table 24: Rejection of other supplementary service control information element contents

Information element	Length	Values (note)	Remark
Rejection of other supplementary service control	9	xxxxxxxx0 ₂	SS-COLP invocation not accepted
		xxxxxx0x ₂	Overriding of SS-CAD invocation for incoming calls not accepted
		xxxxx0xx ₂	Overriding of SS-BIC invocation not accepted
		xxxx0xxx ₂	Overriding of SS-CAD invocation for outgoing calls not accepted
		xxx0xxxx ₂	Overriding of SS-BOC invocation not accepted
		xx0xxxxx ₂	Overriding of SS-CLIR invocation not accepted
		xx0xxxxx ₂	SS-TPI invocation not accepted
		x01xxxxx ₂	Invocation of SS-TPI accepted but with no delivery of priority levels of talking/sending party speech/transmission requests not accepted
		0x1xxxxx ₂	Invocation of SS-TPI accepted but with no delivery of talking/sending party mnemonic name
NOTE: The letter x in the values in that column stands for 0 or 1 indifferently.			

5.2.2.18 Served user extension

The served user extension shall indicate the extended part of the TSI (i.e. the MNI) of the served user, as defined in table 11 of ETS 300 392-9 [7].

5.2.2.19 Served user short number address

The served user short number address refers to the short number address defined for that party. It shall be encoded as the short number information element (see table 25).

5.2.2.20 Served user SSI

The served user SSI shall indicate the Short subscriber identity (SSI) address of the served user, as defined in table 10 of ETS 300 392-9 [7].

5.2.2.21 Short number

Short number shall be encoded as defined in table 25.

Table 25: Short number information element contents

Information element	Length	Value	Remark
Short number	8	0 - 255 ₁₀	

5.2.2.22 SNA PDU type

SNA PDU type shall indicate the type of the SNA PDU, as defined in table 26.

Table 26: SNA PDU type information element contents

Information element	Length	Value	Remark
SNA PDU type	5	00000 ₂	See ETS 300 392-9 [7]
		00001 ₂	See ETS 300 392-9 [7]
		00010 ₂	See ETS 300 392-9 [7]
		00011 ₂	See ETS 300 392-9 [7]
		00100 ₂	See ETS 300 392-9 [7]
		00101 ₂	ASSIGN
		00110 ₂	ASSIGN ACK
		00111 ₂	DEFINE
		01000 ₂	DEFINE ACK
		01001 ₂	INTERROGATE
		01010 ₂	INTERROGATE ACK
		01011 ₂	SS SUPPORT INFO
		> 01011 ₂	Reserved

5.2.2.23 SSI corresponding to short number

The SSI corresponding to short number indicates the Short subscriber identity (SSI) defined against the related short number. That information element will be used as called party SSI by the originating SwMI when the served user has invoked SS-SNA in a SETUP PDU with the value of that short number. It shall be encoded as defined in table 10 of ETS 300 392-9 [7].

5.2.2.24 SS-TPI subscription option(s)

The information element SS-TPI subscription option(s) is defined as a bit-mapped field where each bit corresponds to the control of a specific SS-TPI subscription option. It shall be encoded as defined in table 27.

Table 27: SS-TPI subscription option information element contents

Information element	Length	Value	Remark
SS-TPI subscription option(s)	2	x1 ₂	SS-TPI delivery of talking/sending party mnemonic name.
		1x ₂	SS-TPI delivery of priority levels of talking/sending party speech/transmission requests.

5.2.2.25 Void

5.2.2.26 Void

5.2.2.27 SNA-ISI-PROFILE

SNA-ISI-PROFILE is actually an ANF-ISIMM information sub-element, part of the information element SS-migration profile (original) sent for SS-SNA by the home SwMI to the served user SwMI when that user migrates or when SS-SNA definition is changed, in the ANF-ISIMM PDU SS-PROFILE UPDATE (see ETS 300 392-3-5 [6]).

SNA-ISI-PROFILE shall contain the SS-SNA information elements listed in table 28 as information sub-elements.

Table 28: SNA-ISI-PROFILE information sub-element contents

Information sub-element	Length	Type	C/O/M	Remark
SS-type	6	1	M	SS-SNA
Range type for short number(s)	4	1	M	Note 1
Short number	4	1	M	Note 2
Address type of short number definition	3	1	M	Notes 2 and 3
SSI corresponding to short number	24	1	C	Note 4
Extension corresponding to short number	24	1	C	Note 4
External number length indicator	5	1	C	Notes 4 and 5
External subscriber number	variable	1	C	Note 6
Other supplementary service invocation/invocation overriding	7	1	M	Note 7
SS-TPI subscription option(s)	2	1	C	Note 8
Assignment requested	1	1	M	Note 9
Acknowledgement requested	1	1	C	Note 10
NOTE 1:	The value of that information sub-element shall always be different from 0; the support of a value of that information element larger than 1 is optional.			
NOTE 2:	This information sub-element shall be considered as part of a set which shall be repeated as defined by the range type for short number(s).			
NOTE 3:	The value of that information sub-element shall be equal to the binary value 111_2 when the previous definition of the short number to which it is associated is being deleted by the present ANF-ISIMM profile information sub-element (i.e. SNA-ISI-PROFILE).			
NOTE 4:	Shall be selected as defined by the information sub-element address type of short number definition.			
NOTE 5:	This information sub-element can only be present when the value of the information sub-element address type of short number definition indicates that the short number to which it is associated is defined as corresponding to an external subscriber number. Its value shall then be equal to N, N being the number of digits of that external subscriber number (necessarily different from 0).			
NOTE 6:	The length in digits of the information sub-element external subscriber number shall be as defined by the information sub-element external number length indicator (see note 5), i.e. this information element shall be conditional on the value of N.			
NOTE 7:	Shall be present whenever the value of the information element address type of short number definition does not correspond to the command to delete the existing definition for the short number (see table 17). It shall then be repeated together with that information element.			
NOTE 8:	Shall be conditional on the binary value of the information sub-element other supplementary service invocation/invocation overriding being larger than or equal to 1000000_2 (i.e. corresponding to SS-TPI being invoked when the calling user invokes SS-SNA using the related short number).			
NOTE 9:	If the information sub-element short number is repeated, the information sub-element assignment requested shall apply to all the corresponding short numbers in the present ANF-ISIMM profile information element.			
NOTE 10:	Shall be conditional on the value of the information sub-element assignment requested being equal to 1.			

If they are part of the definition of one or more short numbers for the served user, the elements related to the invocation of other supplementary services or to the overriding of the invocation of other supplementary services shall be included in the corresponding SNA-ISI-PROFILE information sub-element, even if the served user SwMI does not support the corresponding supplementary services.

NOTE 1: The reason for including those elements even when the corresponding supplementary services are not supported is that otherwise a new assignment would be needed for the same short number(s) when the served user migrates into another SwMI which supports those supplementary services.

NOTE 2: There is no need to specify the identity of the user to whom the profile information sub-element specified in the above table applies since the ANF-ISIMM SS-PROFILE UPDATE PDU which carries that information sub-element already includes that identity.

5.2.2.28 SS-SNA profile ACK

Like SS-SNA profile, SS-SNA profile ACK is an ANF-ISIMM information element, sent by the visited SwMI of a subscriber to his home SwMI as part of the SS profile ACK information (see ETS 300 392-3-5 [6]). It shall simply be an acknowledgement of the corresponding SS-SNA profile.

5.2.3 Additional coding requirements over the ISI

The following shall apply for the PSS1 facility information element carrying an APDU of the ROSE operation used by ANF-ISISS for SS-SNA PDUs:

- both the sourceEntity and destinationEntity data elements in the Network Facility Extension of this PSS1 facility information element shall contain the value endPINX;
- no interpretation APDU shall be included in this PSS1 facility information element.

NOTE: As mandated by subclause 10.3 of ETS 300 392-9 [7], each SS-SNA PDU sent by the authorized user (i.e. for definition/interrogation) will include the ITSI of this authorized user as indication of the source of these PDUs when they are extended over the ISI, by invoking ANF-ISISS.

Similarly as mandated by subclause 10.3 of ETS 300 392-9 [7], the corresponding SS-SNA ACK PDUs sent to the authorized user will include the ITSI of this user as their destination.

5.3 SS-SNA state definition

5.3.1 States at the served user MS/LS

Only one conceptual state has been identified in the served user MS/LS for writing all SS-SNA procedures: idle.

5.3.2 States at the served user SwMI

Two types of state definitions have been identified:

- one for SS-SNA assignment;
- the other for invocation and operation and, possibly, definition or interrogation.

5.3.2.1 States for assignment

Three conceptual states have been identified in the served user SwMI for writing the procedures for SS-SNA assignment:

- idle;
- wait_for_assignment;
- SS_non_support_delivered.

The meaning of the state idle is clear. AS to the two other states, the served user SwMI is in state:

- wait_for_assignment when it has successfully sent the ASSIGN PDU to the served user MS/LS and when that PDU has requested that such ASSIGN PDU be acknowledged;
- SS_non_support_delivered when it does not support SS-COLP or SS-TPI and when it has already informed the served user MS/LS about this lack of support.

5.3.2.2 State for invocation and operation and, possibly, definition or interrogation

Only one conceptual state has been identified in the served user SwMI for writing the procedures for SS-SNA invocation and operation and, possibly, definition or interrogation: idle.

5.3.3 State at the authorized user MS/LS

Only one conceptual state has been identified in the authorized user MS/LS for writing the SS-SNA procedures (i.e. possibly for definition or interrogation): idle.

5.3.4 State at the authorized user SwMI

Only one conceptual state has been identified in the authorized user SwMI for writing the SS-SNA procedures (i.e. possibly for definition or interrogation): idle.

5.3.5 State at the served user home SwMI

Only one conceptual state has been identified in the served user home SwMI for writing the SS-SNA procedures (i.e. possibly for definition or interrogation): idle.

5.4 SS-SNA signalling procedures

Examples of message sequences are shown in annex A.

NOTE: Throughout subclause 5.4, the terms calling user and originating SwMI have been used instead of served user and served user SwMI respectively for specifying the invocation and operation procedures (as this was judged more clear).

5.4.1 Actions at the served user MS/LS

The SDL representation of procedures at the calling user MS/LS is shown in clause B.1.

5.4.1.1 Normal procedures

5.4.1.1.1 Invocation and operation

When the calling user has invoked SS-SNA, the information element called party type identifier (see table 93 of ETS 300 392-2 [2]) in the corresponding U-SETUP PDU (see table 86 of ETS 300 392-2 [2]) shall have the binary value 11₂.

Once SS-SNA has been invoked, the procedures defined for the air interface basic call shall apply for the establishment of the call (see subclauses 14.5.1.1 and 14.5.2.1 of ETS 300 392-2 [2]).

5.4.1.1.2 Assignment

The served user MS/LS may support the assignment procedure. That procedure consists in:

- receiving the ASSIGN PDU sent by the served user SwMI;
- acknowledging it in sending the ASSIGN ACK PDU if such acknowledgement has been requested in the ASSIGN PDU, with PDU priority 1.

5.4.1.2 Exceptional procedures

5.4.1.2.1 Invocation

The following shall apply when the calling user has invoked SS-SNA and when that invocation fails for one of the three following reasons:

- the supplementary service has not been subscribed for him;
- he has invoked SS-SNA in using a value of the information element called party short number address in the U-SETUP PDU which is not defined;
- SS-SNA is not supported by the originating SwMI.

When the originating SwMI detects or is informed about one of the three invocation failure cases listed above, the value of the information element disconnect cause in the D-RELEASE PDU sent by the originating SwMI to the calling user's MS/LS shall indicate the above reason which applies (see table 106 of ETS 300 392-2 [2]).

NOTE: The originating SwMI will never detect more than one of the three failure reasons mentioned above (see subclause 5.4.2.2). Thus there is no need to provide the possibility of more than one such reason in the disconnect cause.

5.4.1.2.2 Assignment

No exceptional assignment procedures apply at the served user MS/LS.

5.4.1.2.3 Limitations on other supplementary service invocations/invocation overridings

When the served user MS/LS is registered in another SwMI than his home SwMI, it may receive the SS SUPPORT INFO PDU defined in table 15 to inform the served user that there is at least one of his short numbers which will fail to control one or more other supplementary services as defined if he invokes SS-SNA using that short number.

If the served user MS/LS has already received one or more ASSIGN PDUs defined in table 9, the limitations indicated in the SS SUPPORT INFO PDU shall apply only to the other short number definitions than those already sent in those ASSIGN PDUs.

5.4.2 Actions at the served user SwMI

The SDL representation of procedures at the originating SwMI is shown in clause B.2.

5.4.2.1 Normal procedures

5.4.2.1.1 Operation

When the originating SwMI has received a U-SETUP PDU (see table 86 of ETS 300 392-2 [2]) with a binary value of the information element called party type identifier (see table 93 of ETS 300 392-2 [2]) equal to 11_2 , the originating SwMI shall identify that the calling user has invoked SS-SNA.

NOTE: Since node actions are not to be described as part of the protocol, it should be reminded that, according to ETS 300 392-11-07, on SS-SNA stage 2 description, when the originating SwMI has received a U-SETUP PDU with a binary value of the information element called party type identifier equal to 11_2 , that SwMI will first check whether SS-SNA has been subscribed for the calling user.

The case where the result of that check is negative is addressed in subclause 5.4.2.2. If that result is positive, the originating SwMI will determine the definition of the short number invoked by the calling user. It will then establish the call according to the procedures defined in:

- subclauses 14.5.1.1 and 14.5.2.1 of ETS 300 392-2 [2]) if the call is an intra-TETRA call;
- subclause 6.5.1 of ETS 300 392-3-2 [4]) if the call is an individual call over the ISI;
- subclause 6.5.1 of ETS 300 392-3-3 [5]) if the call is a group call over the ISI.

5.4.2.1.2 Assignment

The served user SwMI may support the assignment procedure. That procedure is triggered by receiving the ANF-ISIMM SS PROFILE UPDATE with the information element SNA-migration profile (original) (see ETS 300 392-3-5 [6]) defining short number(s) (for the served user SwMI) and requesting that such definition(s) be assigned to the served user MS/LS. If the served user SwMI supports that procedure, it shall then:

- send the ASSIGN PDU to the served user MS/LS. The value of the information element assignment requested shall be set to 1 (see table 18) if the information element SNA-migration profile (original) had also requested that the short number assignment be acknowledged;

NOTE: Generally the ASSIGN PDU will be individually addressed to the served user MS/LS. However if the same PDU is to be sent to all the members of a group attached to that group in the served user SwMI, the ASSIGN PDU will be addressed to that group.

- if such acknowledgement has been requested in the ASSIGN PDU, the served user shall wait to receive waiting the ASSIGN ACK PDU from the served user MS/LS.

5.4.2.2 Exceptional procedures

5.4.2.2.1 Operation

When the originating SwMI has received a U-SETUP PDU with a binary value of the information element called party type identifier equal to 11_2 , and if it identifies that SS-SNA has not been subscribed for the calling user, it shall inform the calling user's MS/LS about it in giving the value corresponding to SS-SNA not subscribed to the information element disconnect cause in the D-RELEASE PDU.

If the originating SwMI has received a U-SETUP PDU with a binary value of the information element called party type identifier equal to 11₂, if it has not identified that SS-SNA has not been subscribed for the calling user and if the value of the information element called party short number address in that PDU is not defined, that SwMI it shall inform the calling user's MS/LS about it in giving the value corresponding to SS-SNA not defined to the information element disconnect cause in the D-RELEASE PDU.

NOTE: In addition to the above, if the calling user has invoked SS-SNA and the originating SwMI does not support that supplementary service, that SwMI will inform the calling user's MS/LS about it in giving the value corresponding to SS-SNA not supported to the information element disconnect cause in the D-RELEASE PDU.

5.4.2.2.2 Assignment

If the served user SwMI has sent the ASSIGN PDU to the served user MS/LS with the value of the information element assignment requested set to 1 (see table 18) and if it has not received the corresponding ASSIGN ACK PDU from that MS/LS after a certain time, it may decide to resend the ASSIGN PDU.

The same may hold if the D-FACILITY PDU which carries the ASSIGN PDU has not been acknowledged by the air interface layer 2 (see clause 20 of ETS 300 392-2 [2]).

5.4.2.2.3 Limitations on other supplementary service invocations/invocation overriding

If the served user SwMI is different from the served user home SwMI and if it does not accept the definition of at least one served user short number regarding the control of other supplementary services while it has not been instructed to assign (i.e. download) it to the served user, it may send the SS SUPPORT INFO PDU defined in table 15 to inform the served user about that fact.

5.4.3 Actions at the group home SwMI

If the calling user is registered in the group home SwMI, the provisions of subclause 5.4.2 which apply for a group call shall apply to that SwMI.

If the group home SwMI is different from the originating SwMI (i.e. the calling user is registered in a SwMI different from the group home SwMI), no specific provisions apply for that SwMI for supporting SS-SNA.

NOTE: If the calling user invokes SS-SNA using a short number defined as corresponding to an ITSI and at the same time indicates in his U-SETUP PDU that he is attempting an individual call (in giving the value 0 to the information sub-element communication type in the information element basic service information of that PDU), it is up to the group home SwMI to decide whether to modify the call attempt into a group call or to clear it. If it clears it, it is not considered as a SS-SNA failure cause.

5.4.4 Actions at the called user home SwMI

If the called user home SwMI coincides with the originating SwMI, the provisions of subclause 5.4.2 which apply for an individual call shall apply to that SwMI.

If the called user home SwMI is different from the originating SwMI, no specific provisions apply for that SwMI for supporting SS-SNA.

NOTE: If the calling user invokes SS-SNA using a short number defined as corresponding to an GTSI and at the same time indicates in his U-SETUP PDU that he is attempting a group call (in giving a value different from 0 to the information sub-element communication type in the information element basic service information of that PDU), it is up to the called user home SwMI to decide whether to modify the call attempt into an individual call or to clear it. If it clears it, it is not considered as a SS-SNA failure cause.

5.4.5 Actions at authorized user MS/LS

The SDL representation of procedures at the authorized user MS/LS is shown in clause B.3.

5.4.5.1 Normal procedures

The authorized user MS/LS shall send the DEFINE or INTERROGATE PDUs in U-FACILITY PDUs in filling in the appropriate values for the routing information element (see table 4 of ETS 300 392-9 [7]). Those values shall correspond to the served user home SwMI.

Consequently in accordance with subclause 8.4.1 of ETS 300 392-9 [7], identities included in DEFINE or INTERROGATE PDUs may be indicated using only their SSIs.

Such identities may also be specified using SS-SNA, provided that:

- SS-SNA is supported by the authorized user SwMI; and
- SNA values have been defined against such identities for the authorized user.

The authorized user MS/LS shall receive the DEFINE ACK or INTERROGATE PDUs in D-FACILITY PDUs.

In accordance with subclause 8.4.1 of ETS 300 392-9 [7], the authorized user MS/LS shall complement any identities indicated using only their SSIs which have been included in any received DEFINE ACK or INTERROGATE ACK PDU.

5.4.5.2 Exceptional procedures

Subclause 11.2 of ETS 300 392-9 [7] shall apply for the exceptional procedures at the authorized user MS/LS. In addition, that MS/LS shall recognize the failure causes referred to in subclauses 5.2.2.6 and 5.2.2.12, used in DEFINE ACK and INTERROGATE ACK PDUs, respectively.

NOTE: Such failure causes correspond to the case where the corresponding PDU is supported by the served user home SwMI but cannot be given a positive response.

5.4.6 Actions at the authorized user SwMI

No specific procedures apply for the authorized user SwMI apply when that SwMI is different from the served home SwMI, beyond those specified in subclause 5.1.4.

NOTE: The SDL representation of procedures corresponding to the latter subclause at the authorized user SwMI is shown in clause B.4.

See subclauses 5.4.6.1.1 and 5.4.6.2.1 when the authorized user SwMI coincides with the served home SwMI.

5.4.7 Actions at the served user home SwMI

The SDL representation of procedures at the supplementary service control entity at the served user home SwMI is shown in clauses B.4 and B.5.

5.4.7.1 Normal procedures

5.4.7.1.1 Case where the served user home SwMI coincides with the authorized user SwMI

The served user home SwMI shall:

- receive from the authorized user MS/LS the U-FACILITY PDU containing DEFINE or INTERROGATE PDUs;
- once it has determined the corresponding DEFINE ACK or INTERROGATE ACK PDUs, it shall send them to the authorized user MS/LS. If that SwMI is also the authorized user home SwMI, in accordance with subclause 8.4.1 of ETS 300 392-9 [7], it may then indicate identities in those PDU using only their SSIs.

5.4.7.1.2 Case where the served user home SwMI is different from the authorized user SwMI

The supplementary service control entity at the served user home SwMI shall:

- extract the DEFINE or INTERROGATE PDU(s) in the received ANF-ISISS ROSE Invoke APDUs specified in clause 10 of ETS 300 392-9 [7];
- process those PDUs. Notably, in accordance with subclause 8.4.1 of ETS 300 392-9 [7], the SwMI shall then complement any identities indicated using only their SSIs which have been included in such PDU(s). If the response to an DEFINE or INTERROGATE PDU is positive, the SwMI shall generate the corresponding DEFINE ACK or INTERROGATE ACK PDU, respectively. If the authorized user is registered in his home SwMI (i.e. the authorized user SwMI is the authorized user home SwMI, in accordance with subclause 8.4.1 of ETS 300 392-9 [7], the served user home SwMI may then indicate identities in those PDU using only their SSIs;
- send such ACK PDU(s) according to subclause 9.2 of ETS 300 392-9 [7]. Notably the identity of the authorized user will be added to the DEFINE ACK or INTERROGATE ACK PDU(s) as its (their) final destination in the corresponding ANF-ISISS PDU (see table 24 of ETS 300 392-9 [7]).

5.4.7.2 Exceptional procedures

If the SwMI supports one or more of the DEFINE and INTERROGATE PDUs but cannot give a positive response in the corresponding ACK PDU(s), it shall include in the latter PDUs the appropriate failure cause as defined in:

- subclause 5.2.2.6, for the DEFINE ACK PDUs; and
- subclause 5.2.2.12 for the INTERROGATE ACK PDUs.

In addition, clause 11 of ETS 300 392-9 [7] (referred to in subclause 5.1.4) shall apply.

NOTE: The latter statement means that:

- when the served user home SwMI coincides with the authorized user SwMI, subclause 11.2.1 of ETS 300 392-9 [7] will apply, taking into account the fact that the support of each of the two PDUs: DEFINE and INTERROGATE, is optional or SS-SNA. The information defined in that subclause 11.2.1 of TS 300 392-9 [7] will be sent to the authorized user MS/LS in a D-FACILITY PDU. D-FACILITY PDU will be individually addressed;

- when the served user home SwMI is different from the authorized user SwMI, subclause 11.1 of ETS 300 392-9 [7] will apply, taking into account the fact that the support of each of the two PDUs: DEFINE and INTERROGATE, is optional for S-SNA.

5.5 SS-SNA impact of interworking with other networks

5.5.1 SS-SNA impact of interworking with other TETRA networks

Only the call unrelated procedures (i.e. assignment, definition and interrogation) can extend to several TETRA networks - since SS-SNA invocation and operation procedures apply in a single TETRA network: the originating SwMI. The corresponding cases have already been taken into account in the preceding clauses, except for the exchange of SS-SNA information by ANF-ISIMM. The latter is addressed in subclause 5.6.

5.5.2 SS-SNA impact of interworking with external networks

SS-SNA short numbers may be used for calling external parties. The corresponding definitions and profiles shall then indicate both the numbers of those external parties and the identities (SSI or full ITSI) of the corresponding gateways.

NOTE: When such gateway is defined with only the SSI identity whether or not that SSI is a predefined one for a gateway according to ETR 300-5 [10], the originating SwMI will route the call through the gateway with the SSI identity in the served user home SwMI (since according to subclause 8.4.1 of ETS 300 392-9 [7], it will complement the SSI identity with that of the served user home SwMI, i.e. its MNI).

5.6 Protocol interactions between SS-SNA and other supplementary services and ANFs

For many TETRA supplementary services, management procedures have been defined, e.g. activation, definition, interrogation, to be implemented by the user called the authorized user. For each of those supplementary service management procedures, the authorized user may indicate for which user the procedure applies in indicating the address of the served user using SS-SNA short number in the corresponding SS PDU.

In such a case the authorized user SwMI (i.e. the SwMI where that user is currently registered) shall translate that SS-SNA short number into a full GTSI/ITSI, else simply a SSI if the authorized user home SwMI is the same as the SwMI to which the SS PDU (which is generally the served user home SwMI) - see subclause 8.4.1 of ETS 300 392-9 [7].

NOTE 1: Simultaneous conveyance of call unrelated PDUs for SS-SNA and another supplementary service by the same U-FACILITY PDU, each in accordance with the requirements of its respective stage 3 description standard, does not, on its own, constitute a protocol interaction. The same holds when such PDUs are conveyed by the ANF-ISISS ROSE Invoke APDU, else by the same PSS1 FACILITY message.

Protocol interactions have been identified with:

- ANF-ISIGC and ANF-ISIIC, for the interactions between SS-SNA and SS-BIC or SS-CAD for incoming calls for inter-TETRA calls;
- with ANF-ISIMM, in case of migration of the served user.

NOTE 2: The use of ANF-ISISS for conveying call unrelated SS-SNA PDUs over the ISI has not been considered as a protocol interaction to be addressed in this ETS.

5.6.1 Interaction with ANF-ISIGC and ANF-ISIIC

The protocol interaction between SS-SNA on one hand and ANF-ISIGC and ANF-ISIIC on the other hand occurs when the served user invokes SS-SNA using a short number which triggers the overriding of either SS-BIC or SS-CAD for incoming calls and when the corresponding call is routed over the ISI. Then the value of the appropriate information element overriding of SS-BIC invocation or overriding of SS-CAD invocation for incoming calls shall be set to 1 in the ORIGINATING SETUP PDU of the ANF invoked (ANF-ISIGC if the served user has indicated that he is calling a group or ANF-ISIIC definition if he has indicated that he is calling an individual user).

NOTE: If the information element overriding of SS-BIC invocation had not been added in the specification of the ANF-ISIGC-ORIGINATING SETUP PDU and ANF-ISIIC-ORIGINATING SETUP PDU, a specific ISI PDU would have been necessary in SS-BIC protocol. This would have led to impose a specific SS-BIC requirement to the originating SwMI while otherwise the operation of SS-BIC does not impose any, with problems when that SwMI would not support SS-BIC (i.e. that specific requirement).

A similar argument holds for SS-CAD for incoming calls, although interactions between that supplementary service and other ones have already led to impose some requirements to the originating SwMI (e.g. SS-COLP, SS-TPI, SS-CCBS or SS-CCNR).

5.6.2 Interactions with ISI Mobility Management (ANF-ISIMM)

5.6.2.1 Migration of the served user

When the served user migrates to a visited SwMI, the following exchange of information shall be ensured, through ANF-ISIMM (see ETS 300 392-3-5 [6]):

- the information element basic migration profile (original) in the ANF-ISIMM-PROFILE PDU sent with the value of the profile type information element corresponding to individual subscriber shall indicate that SS-SNA has been subscribed for the served user;
- the visited SwMI shall inform the home SwMI whether or not it supports SS-SNA in the ANF-ISIMM-PROFILE RESPONSE PDU sent back: either
 - in setting the value of the information element basic migration profile info to 0 (i.e. profile accepted as received); or
 - if it has set the value of the information element basic migration profile info to 1 (i.e. profile redefined) in indicating in the information element basic migration profile (temporary) in that PDU whether or not it supports SS-SNA as originating SwMI;
- unless the home SwMI has received earlier the information that the visited SwMI does not support SS-SNA as originating SwMI (in the ANF-ISIMM-PROFILE RESPONSE PDU), when the home SwMI sends the ANF-ISIMM-SS-PROFILE UPDATE PDU to the visited SwMI, it shall include in that PDU the information sub-element SNA-ISI-PROFILE defined in table 28 in the information element SS-migration profile (original) with the value of the information sub-element SS-type corresponding to SS-SNA. The value of the accompanying information sub-element profile status corresponds then to profile replacement;
- the visited SwMI shall then acknowledge the SS-SNA profile information received in the ANF-ISIMM-SS-PROFILE UPDATE PDU as defined in ETS 300 392-3-5 [6]).

5.6.2.2 SS-SNA definition updates for the served user

After the migration procedure specified for SS-SNA in subclause 5.6.2.1 has taken place for the served user, i.e. the home SwMI knows that the visited SwMI supports SS-SNA and has transferred the definitions of short numbers for that user, it may happen that updates are made to some of those definitions or that new definitions are made.

In such a case, when the home SwMI decides to transfer those updates, it shall do so in sending the ANF-ISIMM-SS-PROFILE UPDATE PDU including the information sub-element SS-ISI-PROFILE defined in table 28 in the information element SS-migration profile (original) with the value of the information sub-element SS-type corresponding to SS-SNA. The value of the accompanying information sub-element profile status corresponds then to update.

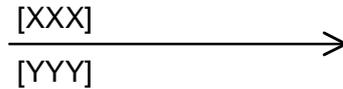
5.7 SS-SNA parameter values (timers)

There shall be no timers for the SS-SNA procedures.

Annex A (informative): Examples of message sequences

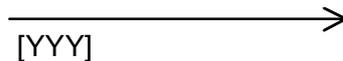
This annex describes some typical message flows for SS-SNA. The following conventions are used in the figures of this annex.

The following notation is used:



where XXX above the arrow refers to a basic call PDU, and YYY below the arrows refers to the specific SS-SNA information element carried by the basic call PDU over the air/line station interface.

If the SS-SNA PDU is independent of basic call, it is simply shown as:



In exceptional operation (i.e. unsuccessful cases), YYY may refer to a ROSE Return Error APDU instead of a SS-SNA PDU.

The figures show messages exchanged at the air (or line station) interface via the Circuit Mode Control entities (CMCE - see clause 14 of ETS 300 392-2 [2]) and over the ISI by the PSS1 Protocol Control between SwMIs involved in SS-SNA. Only messages relevant to SS-SNA are shown.

Only the relevant information content (i.e., SS PDUs and possibly ROSE Return Error APDUs) is listed below each message name. The Facility information elements containing the ROSE APDUs are not explicitly shown. Information with no impact on SS-SNA is not shown.

A.1 Example message sequence for successful operation of SS-SNA

Figure A.1 shows an example of successful operation of SS-SNA.

MSC Successful_invocation

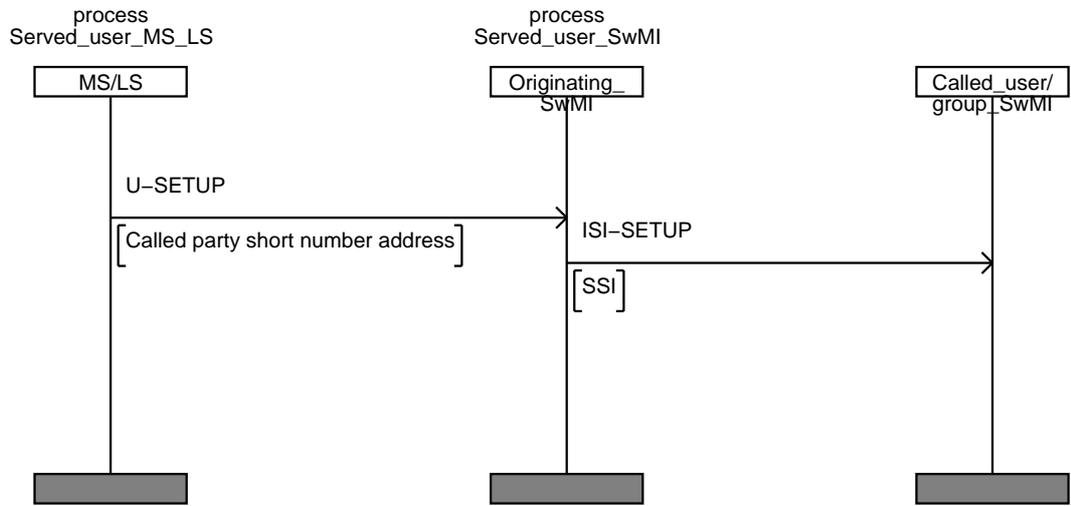


Figure A.1: Message sequence for successful operation of SS-SNA

A.2 Example message sequence for unsuccessful operation of SS-SNA

Figure A.2 shows an example of unsuccessful operation of SS-SNA.

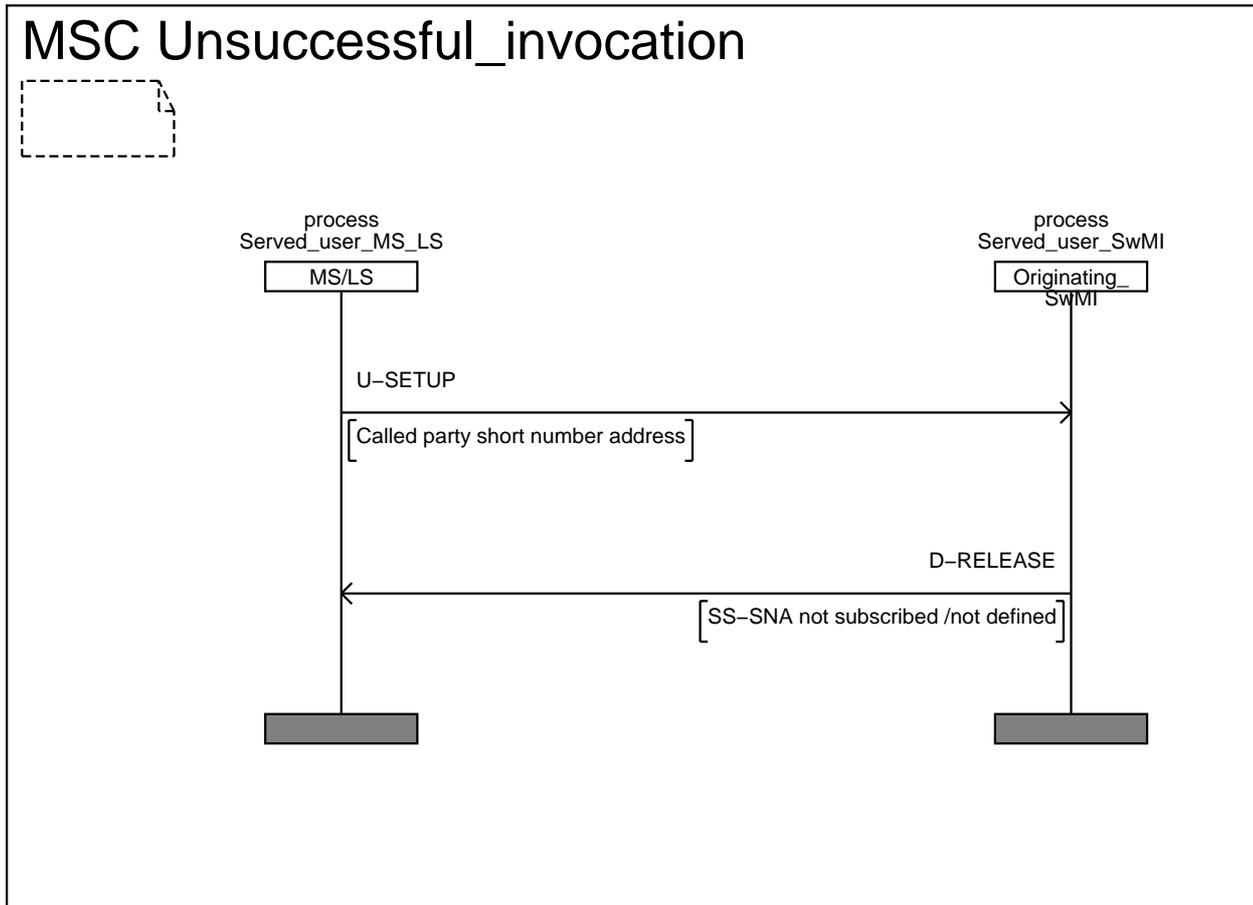


Figure A.2: Message sequence for unsuccessful operation of SS-SNA

Annex B (informative): Specification and Description Language (SDL) representation of procedures

The diagrams in this annex use the Specification and Description Language defined in ITU-T Recommendation Z.100 [11].

The diagrams for MS/LSs and SwMIs represent the behaviour of SS-SNA supplementary service control entities at those MS/LSs and SwMIs, respectively.

NOTE 1: The procedures shown for the authorized user MS/LS, for the authorized user SwMI and for the served user SwMI are generic procedures, i.e. they are not specific to the SS-SNA supplementary service control entities at those MS/LS and SwMIs.

In accordance with the protocol model described in clause 14 of ETS 300 392-2 [2], the supplementary service control entity at a MS/LS uses the services of the air interface basic call control. The same applies for the supplementary service control entity at the SwMI where the MS/LS subscriber is registered. For SS-SNA ISI protocols, in accordance with the protocol model described in clause 8 of ETS 300 392-3-1 [3], the supplementary service control entity (at a SwMI) uses, via the co-ordination function, the services of Generic Functional Transport control for call unrelated procedures.

The basic call actions associated with the sending and receiving of the air interface PDUs specified in ETS 300 392-2 [2] are deemed to occur.

The basic call SETUP PDU with no prefix specifying whether it is an air interface PDU or an ISI PDU is to be understood as being an air interface PDU if the user/group to which it is addressed is registered in the same SwMI, and as ISI PDU, otherwise.

NOTE 2: The basic call PDUs at the air interface or at the ISI which do not carry any SS-SNA information have not been shown on the figures.

The suffix PDU has been omitted after the PDU names (e.g. DEFINE or INTERROGATE ACK).

B.1 SDL representation of SS-SNA at the served user MS/LS

Figure B.1 shows the behaviour of an SS-SNA supplementary service control entity within the served user MS/LS.

Input signals from the right represent air interface PDUs received from the served user SwMI.

Output signals to the right represent air interface PDUs sent to the served user SwMI.

Input signals from the left represent primitives from the served user application.

Input signals from the left represent primitives from the served user application.

Output signals to the left represent primitives to the served user application.

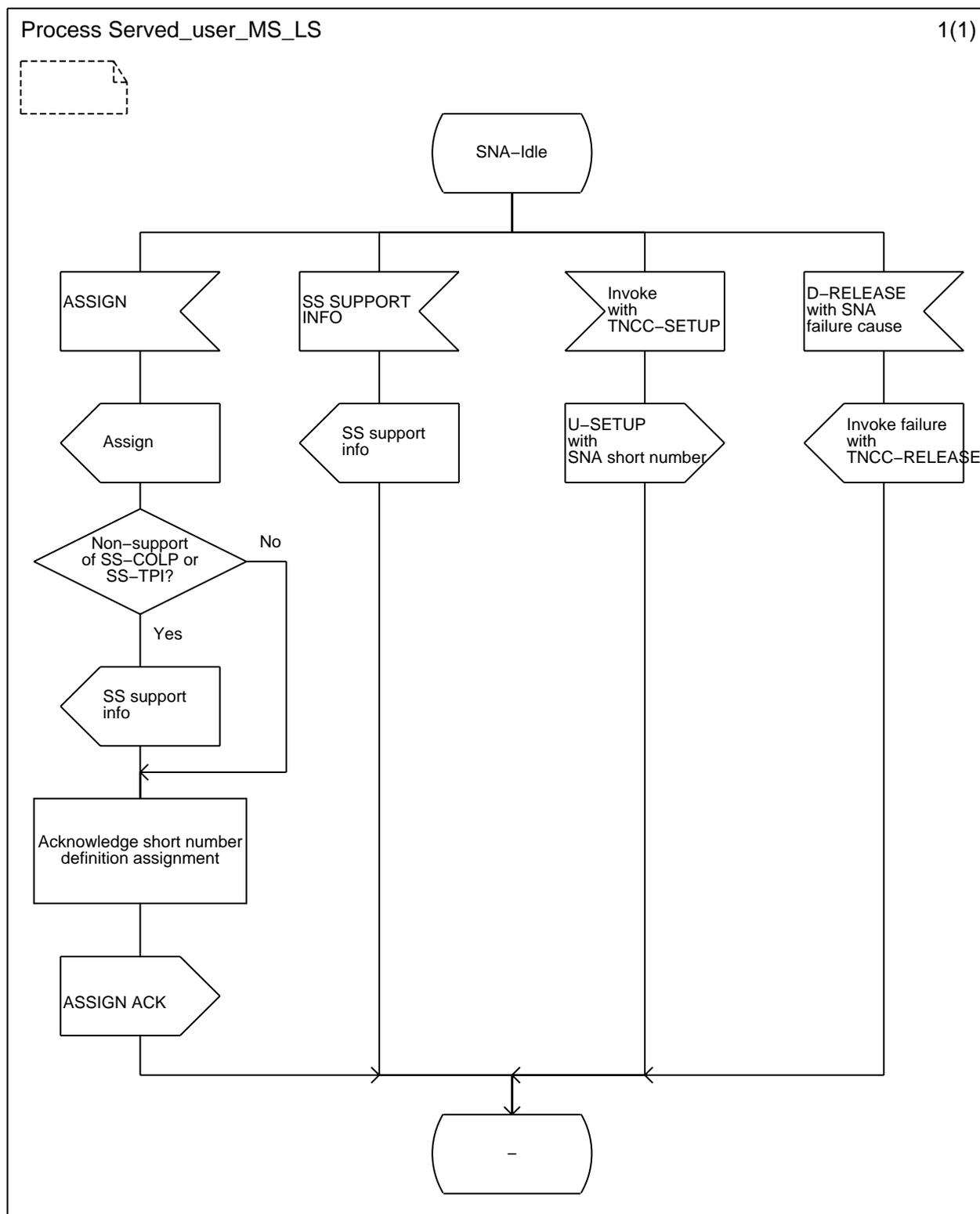


Figure B.1: Served user MS/LS SDL

NOTE: In the case where the served user would have some (limited) authorized user capabilities, the applicable SDL would be the corresponding part of the SDL at the authorized user MS/LS (see clause B.3).

B.2 SDL representation of SS-SNA at the served user SwMI

Figure B.2 shows the behaviour of an SS-SNA supplementary service control entity within the served user SwMI. However sheet 2 and 3 of figure B.2 apply only when the served user SwMI is different from the served user home SwMI (i.e. the served user has migrated). When the served user SwMI coincides with the served user home SwMI (i.e. the served user is registered in his home SwMI), sheet 2 of figure B.5 applies instead.

NOTE 1: There are no definition or interrogation procedures defined for the served user SwMI. In the case where the served user would have some (limited) authorized user capabilities, the states applicable to that SwMI would be the corresponding ones of the authorized user SwMI (see clause B.4).

NOTE 2: For the behaviour of the SS-SNA supplementary service control entity within the served user SwMI for definition and interrogation of this supplementary service see clause B.4 if that SwMI coincides with the home SwMI of the authorized user, and clause B.5 if it coincides with that of the served user.

The only input signal from the right originates from the mobility management entity in the served user SwMI.

Input signals from the left represent PDUs received from the served user MS/LS, except for the time-out shown on sheet 2 of figure B.2 (which originates from the expiry of the assignment timer).

Output signals to the left represent PDUs sent to the served user MS/LS.

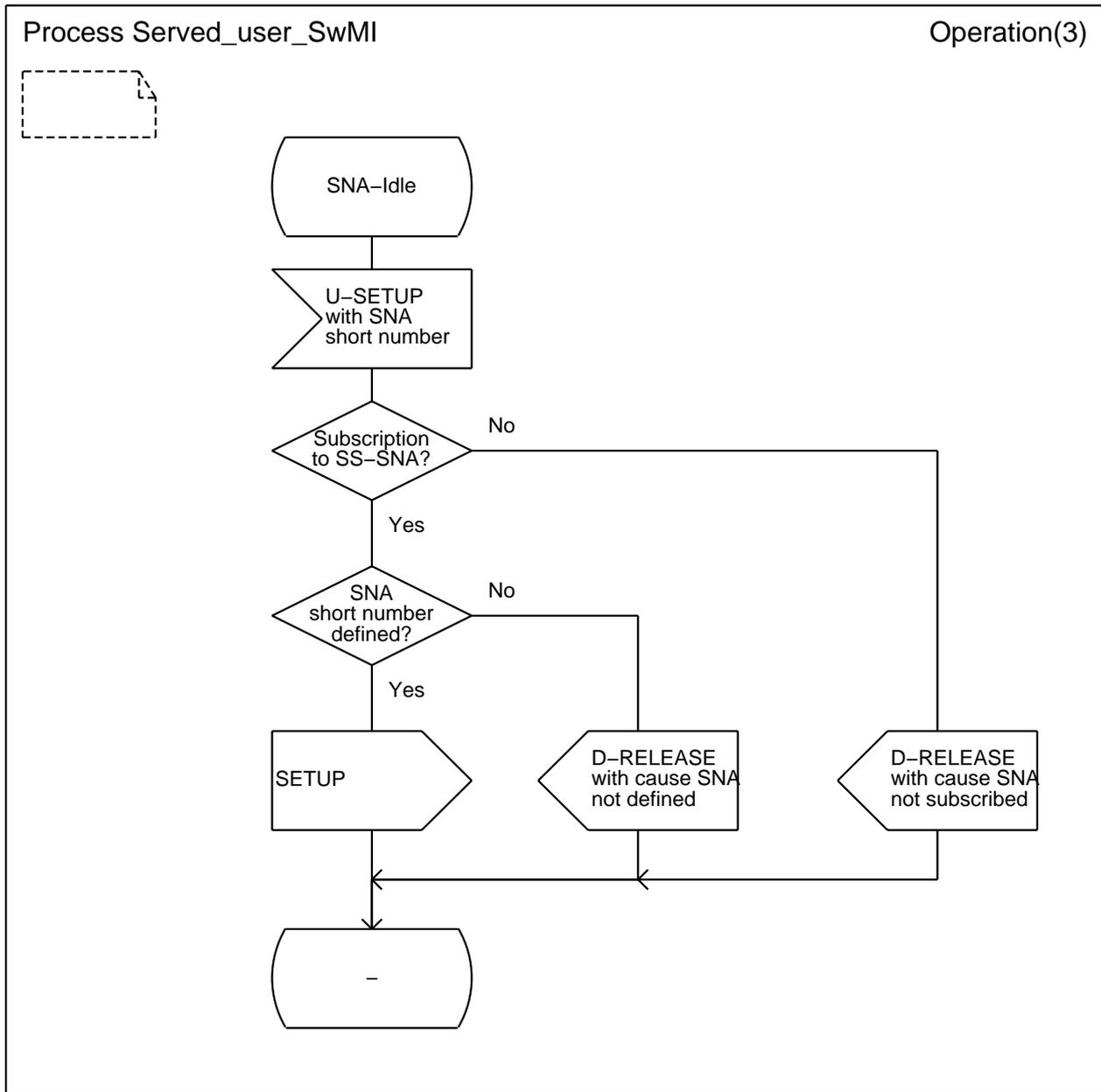


Figure B.2 (sheet 1 of 5): Served user SwMI SDL - Operation

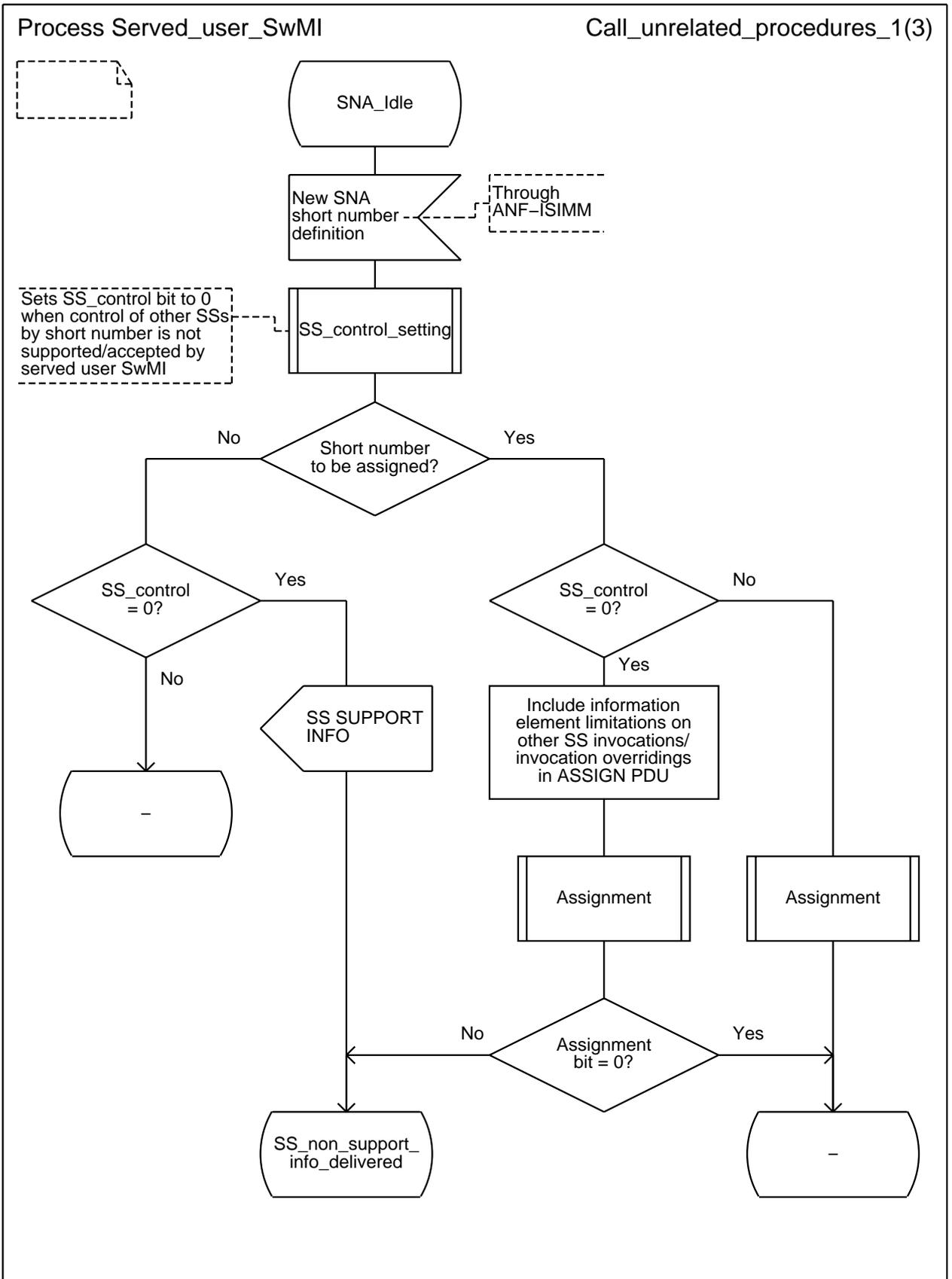


Figure B.2 (sheet 2 of 5): Served user SwMI SDL - Call unrelated procedures_1

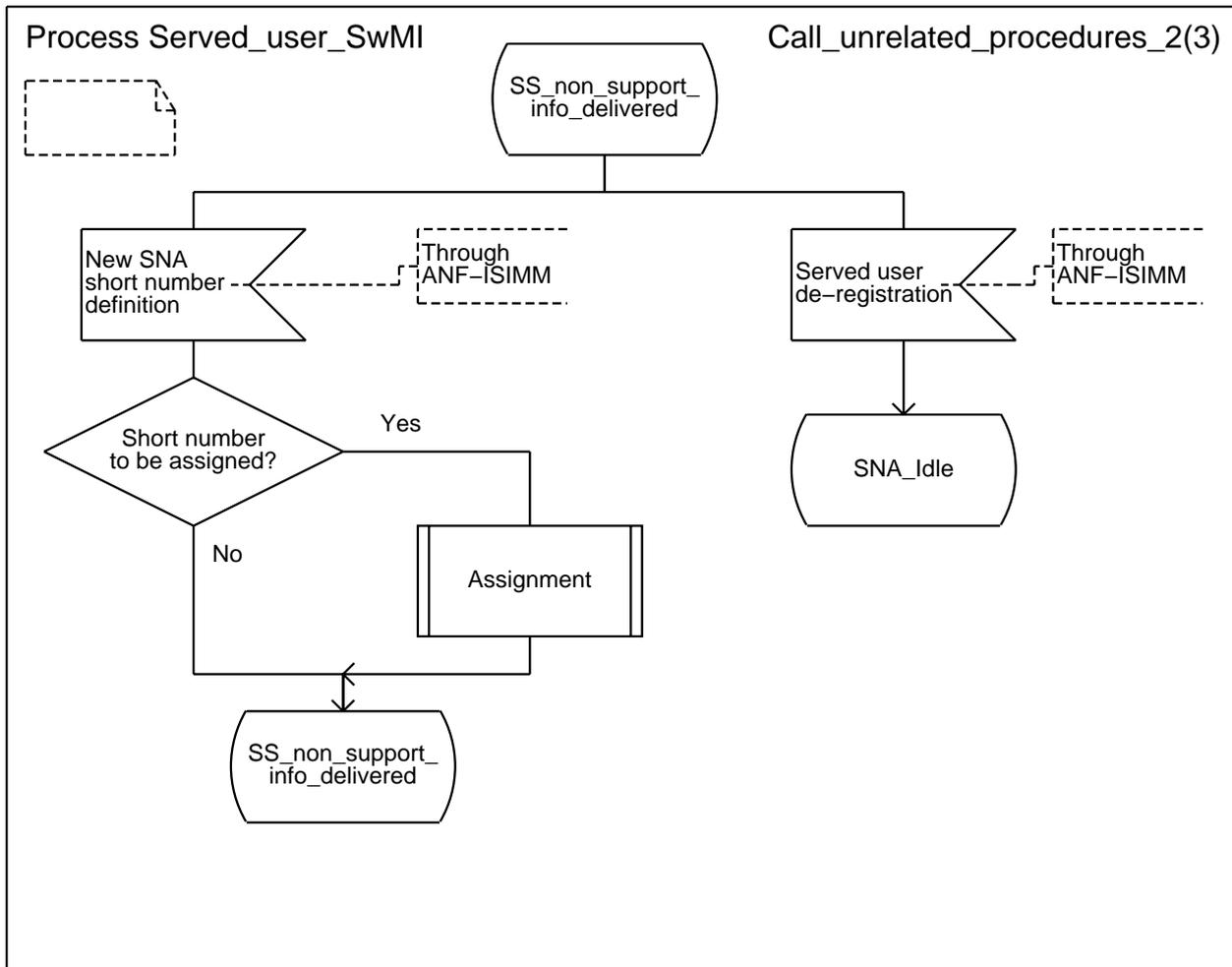


Figure B.2 (sheet 3 of 5): Served user SwMI SDL - Call unrelated procedures_2

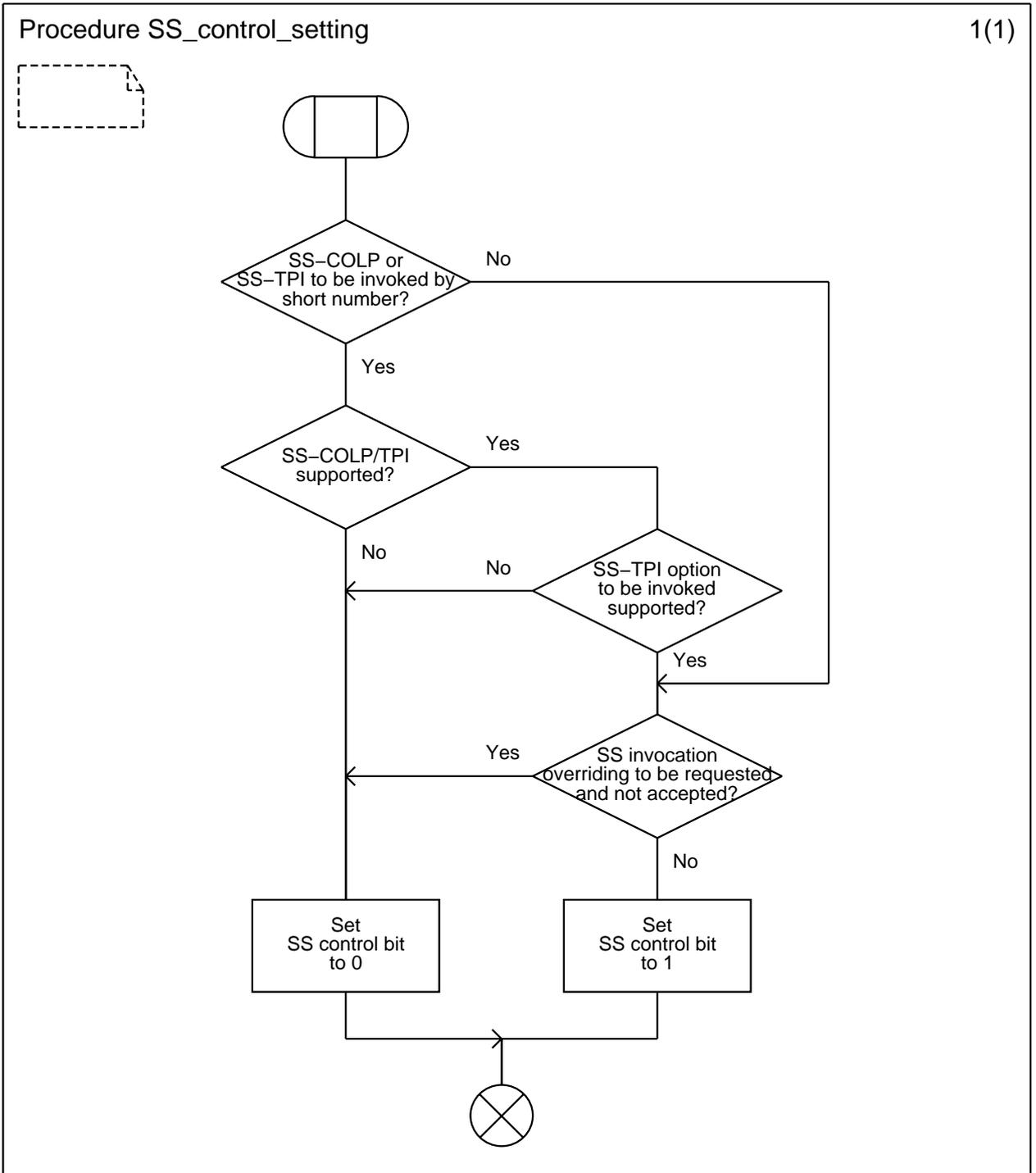


Figure B.2 (sheet 4 of 5): Served user SwMI SDL - SS_control_setting sub-procedure

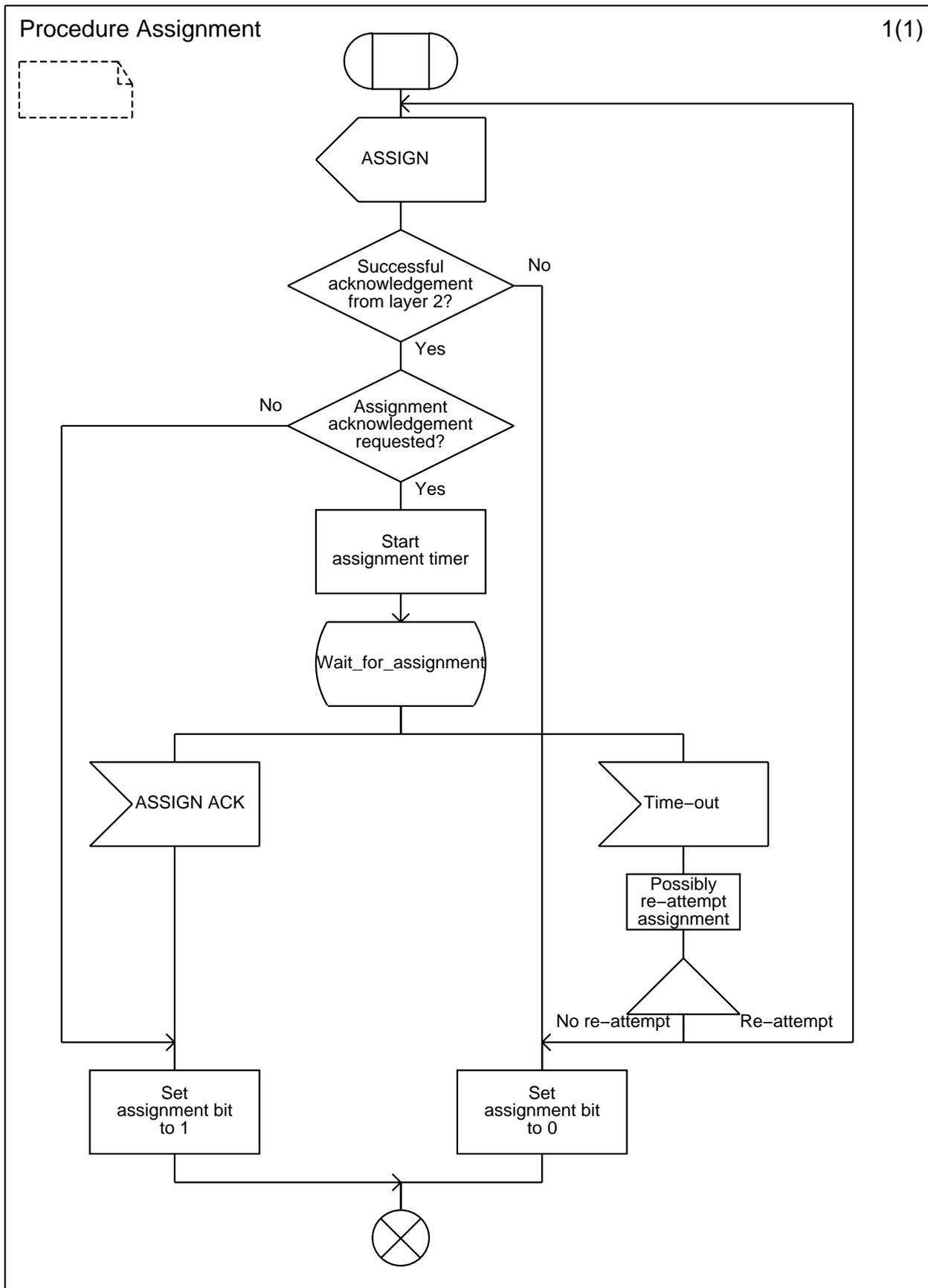


Figure B.2 (sheet 5 of 5): Served user SwMI SDL - Assignment sub-procedure

B.3 SDL representation of SS-SNA at the authorized user MS/LS

Figure B.3 shows the behaviour of an SS-SNA supplementary service control entity within the authorized user MS/LS.

Input signals from the right represent air interface PDUs received from the authorized user SwMI.

Output signals to the right represent air interface PDUs sent to the authorized user SwMI.

Input signals from the left represent primitives from the authorized user application.

Output signals to the left represent primitives to the authorized user application.

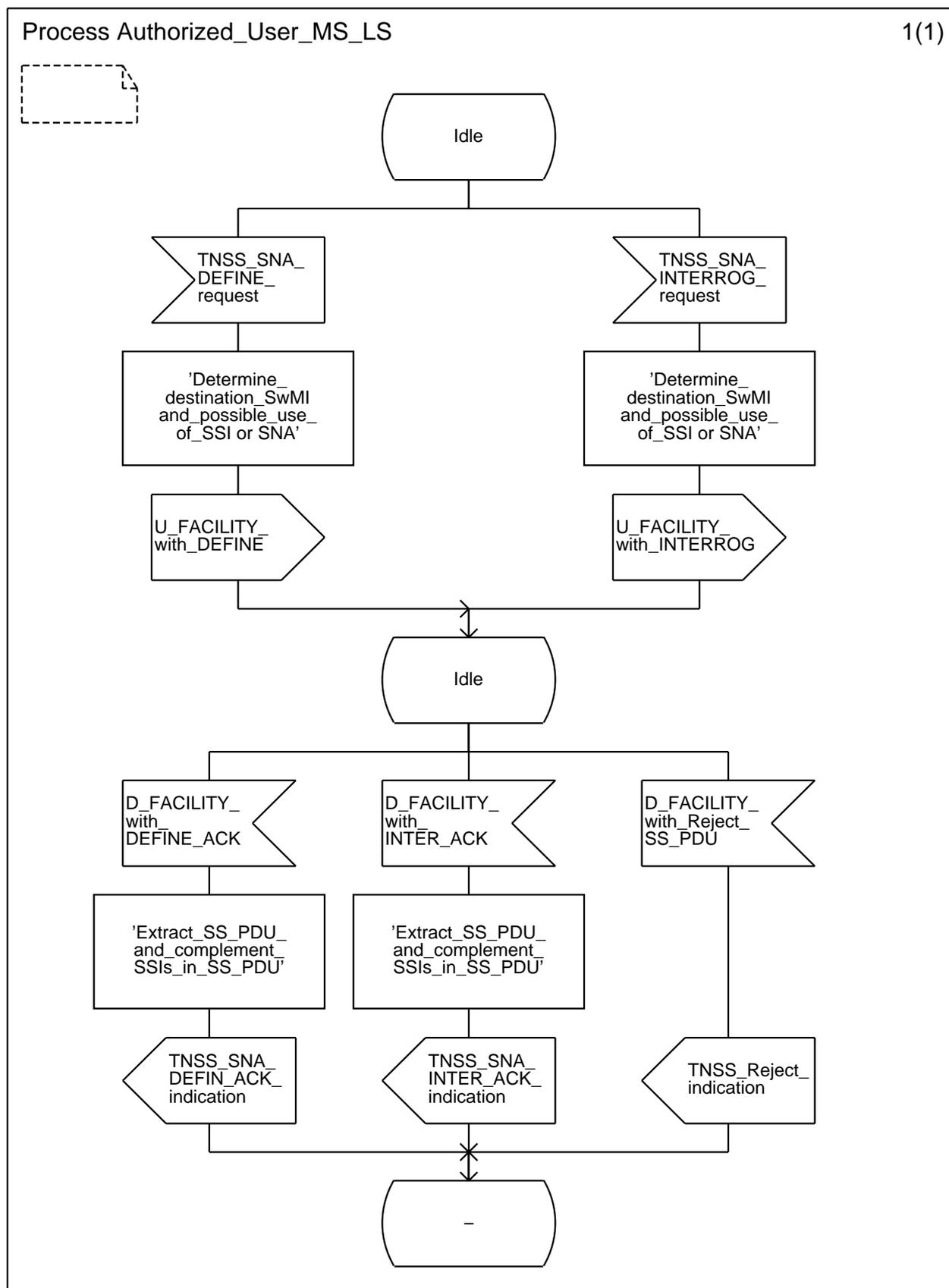


Figure B.3: Authorized user MS/LS SDL

NOTE: In the case where the served user would have some (limited) authorized user capabilities, the SDL in figure B.3 would be applicable to the served user MS/LS.

B.4 SDL representation of SS-SNA at the authorized user SwMI

Figure B.4 shows the behaviour of the supplementary service control entity specific to the authorized user SwMI.

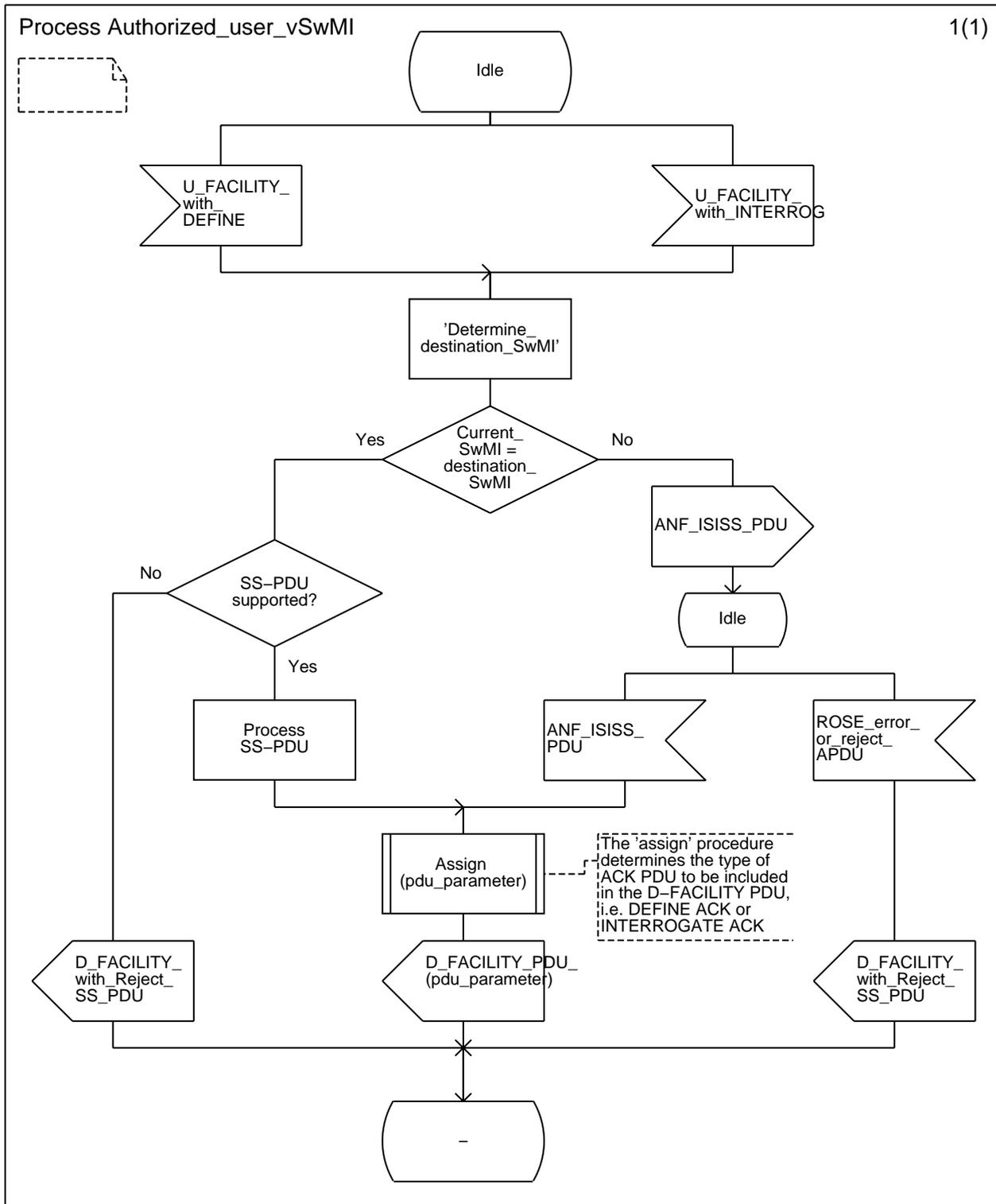
Depending on whether or not that SwMI is also the managed user home SwMI, it is or it is not the destination SwMI of the DEFINE or INTERROGATE PDUs sent by the authorized user MS/LS.

Input signals from the right represent PDUs received from the managed user home SwMI.

Output signals to the right represent PDUs sent to the managed user home SwMI.

Input signals from the left represent PDUs received from the authorized user MS/LS.

Output signals to the left represent PDUs sent to the authorized user MS/LS.



NOTE: Every ANF-ISISS PDU or ROSE APDU is conveyed by a PSS1 FACILITY message. The latter has not been shown in the corresponding signal symbols by lack of space.

Figure B.4: Authorized user SwMI SDL

NOTE 1: In the case where the served user would have some (limited) authorized user capabilities, the SDL in figure B.4 would be applicable to the served user SwMI.

NOTE 2: If the served user SwMI coincides with the authorized user SwMI but they are different from the served user home SwMI, figure B.2 would apply to the authorized user SwMI in addition to figure B.4.

B.5 SDL representation of SS-SNA at the served user home SwMI

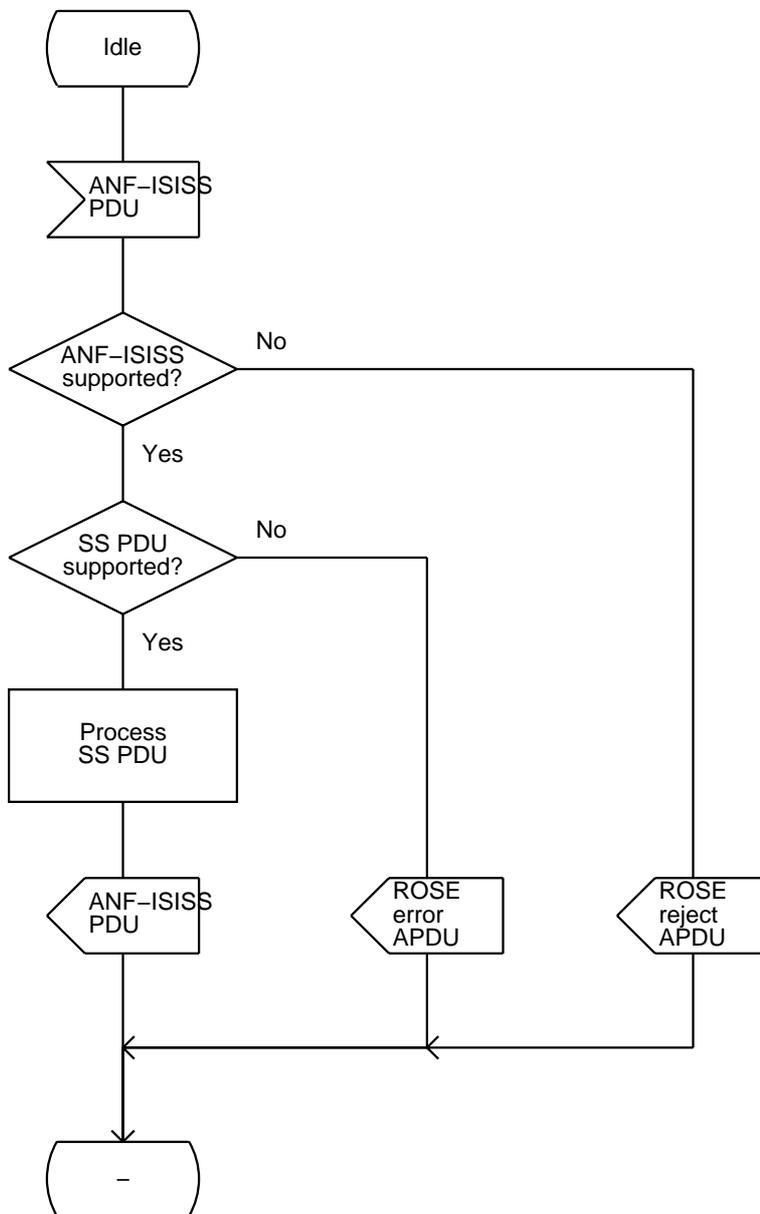
Sheet 1 of figure B.5 shows the behaviour of the supplementary service control entity specific to the served user home SwMI when it is different from the authorized user SwMI, and sheet 2 of figure B.5, when the served user is registered in his home SwMI (i.e. the served user SwMI coincides with the served user home SwMI).

Input signals from the left represent PDUs received from the authorized user SwMI in sheet 1, and internally in sheet 2.

Output signals to the left represent PDUs sent to the authorized user SwMI in sheet 1, and to the served user MS/LS in sheet 2.

Process Served_user_home_SwMI

Distant_definition_or_interrogation(2)



NOTE: Every ANF-ISISS PDU or ROSE APDU is conveyed by a PSS1 FACILITY message. The latter has not been shown in the corresponding signal symbols by lack of space.

Figure B.5 (sheet 1 of 2): Served user home SwMI SDL - Distant definition or interrogation

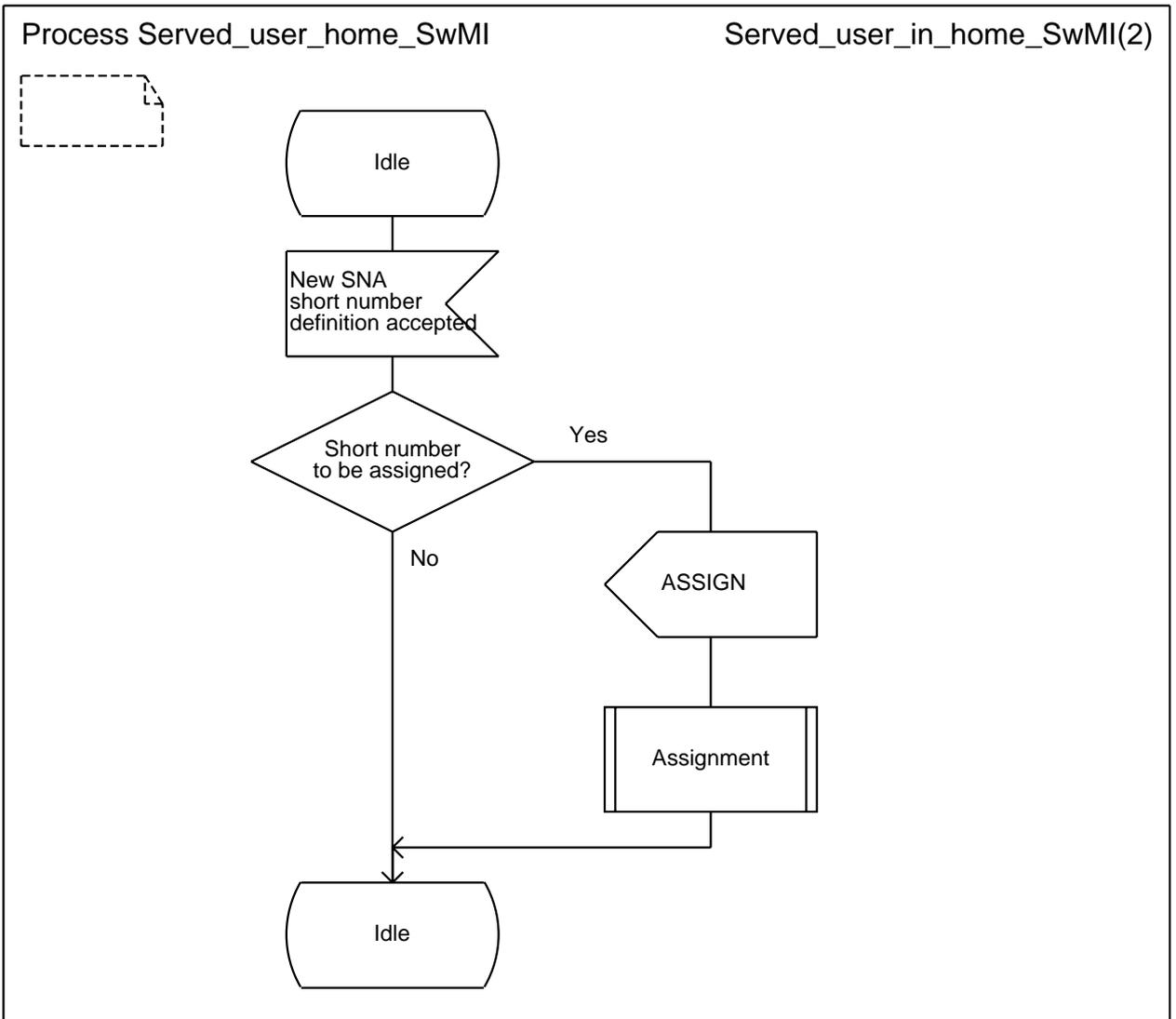


Figure B.5 (sheet 2 of 2): Served user home SwMI SDL - Served user in his home SwMI

NOTE: If the served user is registered in his home SwMI, sheet 1 of figure B.2 would apply to that SwMI in addition to sheet 2 of figure B.5.

Annex C (informative): Bibliography

The following material, though not specifically referenced in the body of the present document (or not publicly available), gives supporting information.

- ISO/IEC 11574 (1994): "Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Circuit-mode 64 kbit/s bearer services - Service description, functional capabilities and information flows".

History

Document history	
May 1999	Public Enquiry PE 9940: 1999-05-05 to 1999-10-01
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