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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 is a multi-part standard and will consist of the following parts:

Part 1:   "General network design".

Part 2:   "Air Interface (AI)".

Part 3:   "Inter-System Inter-working (ISI)".

Part 4:   "Gateways".

Part 5:   "Peripheral Equipment Interface (PEI)".

Part 6:   "Line connected Station (LS)".

Part 7:   "Security".

Part 9:   "General requirements for Supplementary Services (SS)".

Part 10:   "Supplementary Services (SS) stage 1".

Part 11:   "Supplementary Services (SS) stage 2".

Part 12:   "Supplementary Services (SS) stage 3".

Part 13:   "SDL model of the Air Interface (AI)".

Part 14:   "Protocol Implementation Conformance Statement (PICS) proforma specification".

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Date of adoption of this ETS:	9 October 1998
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1   Scope

This ETS defines the stage 3 specifications of the Supplementary Service Access Priority (SS-AP) for the Terrestrial Trunked Radio (TETRA).

The SS-AP enables to define specific priorities in an Mobile Station (MS) for uplink random access messages (at the air interface) for circuit mode or packet mode communications.

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

Supplementary Service (SS) stage 3 specification is preceded by the stage 1 and the stage 2 specifications of the service. Stage 1 describes the functional capabilities from the user's point of view. Stage 2 defines the functional behaviour in terms of functional entities and information flows. Stage 3 gives a precise description of the supplementary service from the implementation point of view. It defines the protocols for the service and the encoding rules for the information flows. It defines the processes for the functional entities and their behaviour. The described protocols and behaviour apply for the Switching and Management Infrastructure (SwMI), for the MS and for the Line Station (LS) and can be applied over the Inter-System Interface (ISI) between TETRA systems.

Aspects relating to all supplementary services are detailed in ETS 300 392-9 [6].

2   Normative references

This ETS incorporates, by dated or 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]   ETS 300 392-2: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 2: Air Interface (AI)".

[2]   EN 300 171: "Private Integrated Services Network (PISN); Specification, functional models and information flows; Control aspects of circuit-mode basic services [ISO/IEC 11574 (1994) modified]".

[3]   ETS 300 392-1: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 1: General network design".

[4]   prETS 300 392-11-9: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 11: Supplementary Services (SS) stage 2; Sub-part 9: Access Priority (AP)".

[5]   ITU-T Recommendation Z.100 (1993): "Specification and Description Language (SDL)".

[6]   prETS 300 392-9: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 9: General requirements for supplementary services".

[7]   ETS 300 392-3-5: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Inter-working at the Inter-System Interface (ISI); Sub-part 5: Additional Network Feature Inter-System Interface for Mobility Management (ANF-ISIMM)".

3 Definitions and abbreviations

3.1 Definitions

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

Access Priority Level (APL): A specific Protocol Data Unit (PDU) priority level defined for an MS by SS-AP for a given primitive access priority and for a given service. The possible services are: circuit mode services (whether invoked as individual calls or as group calls), Short Data Service (SDS), Connection Oriented Network Service (CONS), Specific ConnectionLess Network Service (SCLNS) and supplementary services management.

authorized user: The user authorized to make SS-AP definitions and interrogations.

served user: The user who applies a priority access across the air interface.

3.2 Abbreviations

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

AI	Air Interface
AP	Access Priority
APL	Access Priority Level
CC	basic service Call Control functional entity
CCA	basic service Call Control functional entity Agent

> NOTE 1: CC and CCA are applied as defined in EN 300 171 [2].

CMCE	Circuit Mode Control Entity
CONS	Connection Oriented Network Service
GTSI	Group TETRA Subscriber Identity
FE	Functional Entity
ITSI	Individual TETRA Subscriber Identity
ISI	Inter-System Interface
LS	Line Station
MCC	Mobile Country Code
MMI	Man machine Interface
MNC	Mobile Network Code
MS	Mobile Station
PDU	Protocol Data Unit
SCLNS	Specific ConnectionLess Network Service
SDL	(Functional) Specification and Description Language
SDS	Short Data Service
SNA	Short Number Address
SS	Supplementary Service

> NOTE 2: The abbreviation SS is only used when referring to a specific supplementary service.

SSI	Short Subscriber Identity
SwMI	Switching and Management Infrastructure
TETRA	Terrestrial Trunked Radio
TNCC-SAP	TETRA Network layer Call Control - Service Access Point
TNSS-SAP	TETRA Network layer Supplementary Service - Service Access Point
TSI	TETRA Subscriber Identity

4 SS-AP overview

4.1 Functional model

Functional model for SS-AP consists of Functional Entities FE1 to FE3 as defined in stage 2, refer to ETS 300 392-11-9 [4], subclause 4.1.

These functional entities can be located in different TETRA systems as defined in ETS 300 392-11-9 [4], subclause 4.1

4.2 Protocol structure and protocol stack

The SS-AP specific definition and interrogation information elements shall be conveyed in a U/D-FACILITY PDU over the air and line station interfaces (see ETS 300 392-2 [1], subclause 14.7) and in the ISI-FACILITY PDU over the ISI interface. This ETS is normative for the protocol architecture and user application SAPs within the MS.

5 SS-AP service description

5.1 General

This clause describes SS-AP specific services offered by the CMCE at the TNSS-SAP of the TETRA Voice plus Data (V+D) layer 3 service boundary. The SS-AP service access point may be used in conformance testing as a normative boundary in TETRA Mobile Stations (MSs) and TETRA Line Stations (LSs).

> NOTE: As this ETS only deals with the SS-AP all the service primitives has been shown without a TNSS-AP-prefix e.g. the TNSS-AP-DEFINE request is shortened into a DEFINE request.

5.2 SS-AP services offered over the TNCC-SAP

Refer to ETS 300 392-2 [1], subclause 11.3 for primitives.

5.3 SS-AP services offered packet data services

SS-AP may be applied for packet data services. It is outside the scope of this ETS how PDU priority is derived from priority values defined for packet data services, refer to ETS 300 392-2 [1], clauses 24, 25, 26 and 27. As default PDU priority values 1/4/7 will be used for low, high and emergency priorities correspondingly.

5.4 SS-AP services offered over the TNSS-SAP

5.4.1 SS-AP primitives

The SS-AP service primitives at the authorized user MS/LS (FE3) TNSS-SAP shall be:

  a)   DEFINE request;

  b)   DEFINE indication;

  c)   INTERROGATE request;

  d)   INTERROGATE indication.

The SS-AP service primitive at the served user MS (FE1) TNSS-SAP shall be:

  a)   ASSIGN indication.

The information contained in the following service primitive description tables corresponds to the following key:

- C/O/M: conditional/optional/mandatory;
- Remark: comment.

5.4.2 ASSIGN indication

ASSIGN indication primitive shall be offered from FE1 to the application over TNSS-SAP if FE1 accepted the definition. FE1 should accept the definition, if possible. The primitive shall contain the SS-AP parameters listed in table 1.

Table 1: ASSIGN indication

Parameter	C/O/M	Remark
Defined subscriber identity	M	
Services	M	
APL for low priority	M	
APL for high priority	M	

5.4.3 DEFINE request

DEFINE request primitive shall be offered from the application to FE3 over TNSS-SAP. The primitive shall contain the SS-AP parameters listed in table 2.

If the defined subscriber identity is repeated, the definitions shall apply to all listed subscriber identities.

Table 2: DEFINE request

Parameter	C/O/M	Remark
Access priority	O	Default is "Low"
Defined subscriber identity	M	Repeatable
Services	M	
APL for low priority	M	note
APL for high priority	M	note
Acknowledgement requested	M	
NOTE: "APL for low priority" corresponds to AP value "low"; "APL for high priority" corresponds to AP value "high", as defined in ETS 300 392-2 [1].		

5.4.4 DEFINE indication

DEFINE indication primitive shall be offered from FE3 to the application over TNSS-SAP. The primitive shall contain the SS-AP parameters listed in table 3.

The values for APL for low/high can be changed by FE2 if the authorized user is not allowed the values he requests in the definition request. If the values are changed, the new values shall be indicated in DEFINE indication primitive to the authorized user. If the request is rejected, the APL for low/high parameters shall be omitted from the primitive.

> NOTE: If the acknowledgements are different for different "Defined subscriber identities", FE3 delivers several DEFINE indication primitives to application.

Table 3: DEFINE indication

Element	C/O/M	Remark
Defined subscriber identity	M	Repeatable
Definition result	M	
Services	C	note
APL for low priority	C	note
APL for high priority	C	note
NOTE: Present when "Definition result" is "Accepted".		

5.4.5 INTERROGATE request

INTERROGATE request primitive shall be offered from the application to FE3 over TNSS-SAP when the authorized user makes an interrogation request. INTERROGATE primitive shall contain the SS-AP parameters listed in table 4.

This interrogated subscriber identity may be repeated.

Table 4: INTERROGATE request

Parameter	C/O/M	Remark
Access priority	O	Default is "Low"
Interrogated subscriber identity	M	Repeatable

5.4.6 INTERROGATE indication

INTERROGATE indication primitive shall be offered from FE3 to the application over TNSS-SAP as a response to a previously sent interrogation request. INTERROGATE indication primitive shall contain the SS-AP parameters listed in table 5.

If the interrogated subscriber type contains several subscriber identities, the definitions shall apply to all listed subscriber identities.

NOTE: If definitions are different for different "interrogated subscriber identities" FE3 delivers several INTERROGATE indication primitives to application.

Table 5: INTERROGATE indication

Parameter	C/O/M	Remark
Interrogated subscriber identity	M	Repeatable
Interrogation result	M	
Services	C	note
APL for low priority	C	note
APL for high priority	C	note
NOTE: Present only when the "Interrogation result" is "Accepted".		

5.5 Parameter descriptions

Access priority =

    low;
    high.

APL for high priority =

    priority level 0;
    priority level 1;
    priority level 2;
    priority level 3;
    priority level 4;
    priority level 5;
    priority level 6.

APL for low priority, see APL for high priority

defined subscriber identity =

    TETRA Subscriber Identity (TSI) = Short Subscriber Identity (SSI) + Mobile Country Code (MCC) + Mobile Network Code (MNC) (see ETS 300 392-1 [3], clause 7).

definition result =

> accepted;
> request failed for undefined reason;
> user not authorized;
> unknown TETRA identity;
> range not supported.

interrogated subscriber identity, see defined subscriber identity.

interrogation result =

> accepted;
> request failed for undefined reason;
> user not authorized;
> unknown TETRA identity;
> range not supported.

services =

> a combination of:
> circuit mode speech;
> circuit mode data;
> packet mode data;
> Short Data Service (SDS);
> supplementary services management.

6 SS-AP protocol description

6.1 PDU Descriptions

The Facility element which is used to convey the supplementary service information to and from MS/LS and over the ISI shall be transported in a D/U-FACILITY and in an ISI-FACILITY PDU respectively. The element coding used is in accordance with the general rules specified in ETS 300 392-2 [1], clause 14.

The SS-AP PDU encoding is detailed in the following clauses.

The information contained in the following PDU description tables correspond to the following key:

- Length: length of the element in bits;
- Type: element type (1, 2 or 3) described in ETS 300 392-2 [1];
- C/O/M: conditional/optional/mandatory;
- Remark: comment.

The elements that follow the "Defined/Interrogated subscriber identities" in the PDU shall be valid for all the given "Defined/Interrogated subscriber identities".

6.1.1 ASSIGN PDU

ASSIGN PDU is offered from FE2 to FE1. ASSIGN PDU shall contain the SS-AP information elements listed in table 6.

An ITSI family is identified by its ITSI or any valid GTSI of that ITSI family, any of which can be used as a lower layer TETRA address. An assignment shall be valid for whole ITSI family in an MS.

This PDU is mandatory for support of SS-AP.

Table 6: ASSIGN PDU contents

Information element	Length	Type	C/O/M	Remark
SS type	6	1	M	Defined in ETS 300 392-9 [6]
AP PDU type	5	1	M	ASSIGN
Services	5	1	M	
APL for low priority	3	1	C	note
APL for high priority	3	1	C	note
Acknowledgement request	1	1	M	
NOTE: Shall be valid for services defined in the Service information element.				

6.1.2 ASSIGN ACK PDU

ASSIGN ACK PDU is offered from FE1 to FE2.

ASSIGN ACK PDU shall contain the SS-AP information elements listed in table 7.

This PDU is mandatory for MS and optional for SwMI for support of SS-AP assignment.

Table 7: ASSIGN ACK PDU contents

Information element	Length	Type	C/O/M	Remark
SS type	6	1	M	Defined in ETS 300 392-9 [6]
AP PDU type	5	1	M	ASSIGN ACK
Assignment result	1	1	M	
Services	5	1	C	note
NOTE: This information element indicates the services for which assignment failed and shall be present only when the Assignment result is "Not accepted".				

6.1.3 DEFINE PDU

DEFINE PDU is sent from FE3 to FE2. DEFINE PDU shall contain the SS-AP information elements listed in table 8.

This PDU is mandatory for support of SS-AP definition.

Table 8: DEFINE PDU contents

Information element	Length	Type	C/O/M	Remark
SS type	6	1	M	Defined in ETS 300 392-9 [6]
AP PDU type	5	1	M	DEFINE
Range type for defined subscriber identity	4	1	M	note 1
Defined subscriber address type	2	1	C	note 2
Defined subscriber short number address	8	1	C	note 3, note 4
Defined subscriber SSI	24	1	C	note 3, note 4
Defined subscriber extension	24	1	C	note 3, note 4
Range for services	4	1	M	note 1, note 5
Services	5	1	C	note 6
APL for low priority	3	1	C	note 6, note 7
APL for high priority	3	1	C	note 6, note 7
NOTE 1: Refer to ETS 300 392-9 [6] for the range.				
NOTE 2: Shall be repeated as indicated by Range type for defined subscriber identity information element.				
NOTE 3: Conditional on the Address type for defined subscriber information element.				
NOTE 4: For information element coding see ETS 300 392-2 [1], subclauses 14.7 and 14.8.				
NOTE 5: Shall indicate a non-empty range.				
NOTE 6: Shall be repeated as a set as indicated by Range for services information element.				
NOTE 7: Shall be valid for services defined in the Services information element.				

6.1.4 DEFINE ACK PDU

DEFINE ACK PDU is offered from FE2 to FE3. If the acknowledgements are different for different "Defined subscriber identities" FE2 shall send several DEFINE ACK PDUs to FE3.

DEFINE ACK PDU shall contain the SS-AP information elements listed in table 9.

This PDU is mandatory for support of SS-AP definition.

Table 9: DEFINE ACK PDU contents

Information element	Length	Type	C/O/M	Remark
SS type	6	1	M	Defined in ETS 300 392-9 [6]
AP PDU type	5	1	M	DEFINE ACK
Range type for defined subscriber identity	4	1	M	note 1
Defined subscriber address type	2	1	C	note 2
Defined subscriber SSI	24	1	C	note 3
Defined subscriber extension	24	1	C	note 3
Multiple user mask present	1	1	M	
Multiple user mask	variable	1	C	note 4
Definition result	1	1	M	
Failure reason	3	1	C	note 5
Range for services	4	1	C	note 1, note 6
Services	5	1	C	note 6, note 7
APL for low priority	3	1	C	note 6, note 7
APL for high priority	3	1	C	note 6, note 7

NOTE 1:	Refer to ETS 300 392-9 [6] for the range.
NOTE 2:	Shall be repeated as indicated by Range type for defined subscriber identity information element.
NOTE 3:	Conditional on the Address type for defined subscriber information element. For information element coding see ETS 300 392-2 [1], subclauses 14.7 and 14.8.
NOTE 4:	This information element shall be present only when the Multiple user mask present information element indicates "Present". This information element shall be used, when the definition result information element is valid only against a subset of the restricted users. The length of the information element shall be equal to the number of users in the range for restricted users.
NOTE 5:	This information element shall indicate definition result against those restricted users indicated in the Multiple user mask information element or all users in the range when the Multiple user result information element is not present.
NOTE 5:	Shall be present only when Result of definition is "Not accepted".
NOTE 6:	The information element and elements controlled by the Range for services information element shall be present only when the Result of definition is "Accepted".
NOTE 7:	Shall be repeated as a set as defined by Range for services information element.

6.1.5 INTERROGATE PDU

INTERROGATE PDU is offered from FE3 to FE2. INTERROGATE PDU shall contain the SS-AP information elements listed in table 10.

This PDU is mandatory for support of SS-AP interrogation.

Table 10: INTERROGATE PDU contents

Information element	Length	Type	C/O/M	Remark
SS type	6	1	M	Defined in ETS 300 392-9 [6]
AP PDU type	5	1	M	INTERROGATE
Range type for interrogated subscriber identity	4	1	M	note 1
Interrogated subscriber address type	2	1	C	note 2
Interrogated subscriber short number address	8	1	C	note 3, note 4
Interrogated subscriber SSI	24	1	C	note 3, note 4
Interrogated subscriber extension	24	1	C	note 3, note 4
NOTE 1: Refer to ETS 300 392-9 [6] for the range.				
NOTE 2: Shall be repeated as defined by the Range type for defined subscriber identity information element.				
NOTE 3: Conditional on the Address type for defined subscriber information element.				
NOTE 4: For information element coding see ETS 300 392-2 [1], subclauses 14.7 and 14.8.				

6.1.6 INTERROGATE ACK PDU

INTERROGATE ACK PDU is offered from FE2 to FE3.

> NOTE 1: If definitions/responses are different for different "Interrogated subscriber identities" FE2 sends several INTERROGATE ACK PDUs to FE3.

> NOTE 2: When an INTERROGATE PDU contains an Interrogated subscriber short number address or addresses, the corresponding INTERROGATE ACK PDU will contain corresponding SSIs or ITSIs as appropriate.

INTERROGATE ACK PDU shall contain the SS-AP information elements listed in table 11.

This PDU is mandatory for support of SS-AP interrogation.

Table 11: INTERROGATE ACK PDU contents

Information element	Length	Type	C/O/M	Remark
SS type	6	1	M	Defined in ETS 300 392-9 [6]
AP PDU type	5	1	M	INTERROGATE ACK
Range type for interrogated subscriber identity	4	1	M	note 1
Interrogated subscriber address type	2	1	C	note 2
Interrogated subscriber SSI	24	1	C	note 3
Interrogated subscriber extension	24	1	C	note 3
Multiple user mask present	1	1	M	
Multiple user mask	variable	1	C	note 4
Interrogation result	1	1	M	
Failure reason	3	1	C	note 5
Range for services	4	1	C	note 6
Services	5	1	C	note 6, note 7
APL for low priority	3	1	C	note 6, note 7
APL for high priority	3	1	C	note 6, note 7
NOTE 1: Refer to ETS 300 392-9 [6] for the range.				
NOTE 2: Shall be repeated as indicated by Range type for interrogated subscriber identity information element.				
NOTE 3: Conditional on the Address type for interrogated subscriber information element. For information element coding see ETS 300 392-2 [1], subclauses 14.7 and 14.8.				
NOTE 4: This information element shall be present only when the Multiple user mask present information element indicates "Present". This information element shall be used, when the interrogation result information element is valid only against a subset of the restricted users. The length of the information element shall be equal to the number of users in the range for restricted users.				
NOTE 5: This information element shall indicate interrogation result against those restricted users indicated in the Multiple user mask information element or all users in the range when the Multiple user result information element is not present.				
NOTE 5: Shall be present only when Interrogation result is "Not accepted".				
NOTE 6: The information element and elements controlled by the Range for services element shall be present only when the Interrogation result is "Accepted".				
NOTE 7: Shall be repeated as a set as defined by Range for services information element.				

6.1.7 PROFILE element

PROFILE element is sent using ANF-ISIMM protocol from FE2 in the home SwMI to FE2 in the visited SwMI either upon migration of an individual user or when APLs are modified due to a definition. PROFILE PDU shall contain the SS-AP information elements listed in table 12.

This PDU is mandatory for support of SS-AP assignment over ISI.

Table 12: PROFILE element contents

Information element	Length	Type	C/O/M	Remark
Range type for defined subscriber identity	4	1	M	note 1, note 2
Defined subscriber address type	2	1	C	note 3
Defined subscriber SSI	24	1	C	note 4, note 5
Defined subscriber extension	24	1	C	note 4, note 5
Range for services	4	1	M	note 1
Services	5	1	M	note 6, note 7
APL for low priority	2	1	M	note 6, note 7
APL for high priority	2	1	M	note 6, note 7
NOTE 1: Refer to ETS 300 392-9 [6] for the range.				
NOTE 2: In an individual user migration the range information element shall indicate a single user. In profile update the range may be one or more users.				
NOTE 3: Shall be repeated as indicated by Range type for defined subscriber identity information element.				
NOTE 4: Conditional on the Address type for defined subscriber information element.				
NOTE 5: For information element coding see ETS 300 392-2 [1], subclauses 14.7 and 14.8.				
NOTE 6: Shall be repeated as a set as indicated by Range for services information element.				
NOTE 7: Shall be valid for all defined identities.				

6.1.8 PROFILE ACK element

PROFILE ACK element is sent using ANF-ISIMM protocol from FE2 in the visited SwMI to FE2 in the home SwMI as a response to PROFILE element. PROFILE ACK element shall contain the SS-AP information elements listed in table 13.

This PDU is mandatory for support of SS-AP assignment over ISI.

Table 13: PROFILE ACK element contents

Information element	Length	Type	C/O/M	Remark
Range type for defined subscriber identity	4	1	M	note 1, note 2
Defined subscriber address type	2	1	C	note 3
Defined subscriber SSI	24	1	C	note 4, note 5
Defined subscriber extension	24	1	C	note 4, note 5
Range for services	4	1	M	
Services	5	1	C	note 6, note 7
APL for low priority	2	1	C	note 6, note 7
APL for high priority	2	1	C	note 6, note 7
NOTE 1: Refer to ETS 300 392-9 [6] for the range.				
NOTE 2: In an individual user migration the range information element shall indicate a single user. In profile update the range may be one or more users.				
NOTE 3: Shall be repeated as indicated by Range type for defined subscriber identity information element.				
NOTE 4: Conditional on the defined subscriber address type information element.				
NOTE 5: For information element coding see ETS 300 392-2 [1], subclauses 14.7 and 14.8.				
NOTE 6: Shall be repeated as a set as indicated by Range for services information element.				
NOTE 7: Shall be valid for all defined identities.				

6.2   Information element coding

6.2.1   Acknowledgement requested

Acknowledgement requested shall indicate whether a response is requested. Acknowledgement requested information element shall be as defined in table 14.

Table 14: Acknowledgement requested contents

Information element	Length	Value	Remark
Acknowledgement requested	1	0	No acknowledgement shall be returned
		1	Acknowledgement requested

6.2.2   AP PDU type

AP PDU type information element shall indicate the PDU encoding the type of the action as defined in table 15.

Table 15: AP PDU type contents

Information element	Length	Value	Remark
AP PDU type	5	00000_2	See ETS 300 392-9 [6]
		00001_2	See ETS 300 392-9 [6]
		00010_2	See ETS 300 392-9 [6]
		00011_2	See ETS 300 392-9 [6]
		00100_2	See ETS 300 392-9 [6]
		00101_2	DEFINE
		00110_2	DEFINE ACK
		00111_2	INTERROGATE
		01000_2	INTERROGATE ACK
		01001_2	ASSIGN
		01010_2	ASSIGN ACK
		others	Reserved

6.2.3   APL for high priority

APL for high priority shall indicate the numeric value for the APL. APL for high priority information element shall be as defined in table 16.

Table 16: APL priority contents

Information element	Length	Value	Remarks
APL priority	3	000_2	0
		001_2	1
		010_2	2
		011_2	3
		100_2	4
		101_2	5
		110_2	6
		111_2	Reserved for emergency

6.2.4   APL for low priority

APL for low priority shall indicate the numeric value for the APL. APL for low priority information element shall be as defined in table 16.

6.2.5 Assignment result

Assignment result shall indicate whether the previously made assignment request was successful or unsuccessful. Assignment result information element shall be as defined in table 17.

Table 17: Assignment result contents

Information element	Length	Value	Remark
Assignment result	1	0	Not accepted
		1	Accepted

6.2.6 Defined subscriber address type

The Defined subscriber address type information element shall indicate the type of defined subscriber identity element or elements that follow as defined in ETS 300 392-9 [6].

6.2.7 Definition result

Definition result shall indicate whether the previously made definition request was successful or unsuccessful. Definition result information element shall be as defined in table 18.

Table 18: Definition result contents

Information element	Length	Value	Remark
Definition result	1	0	Not accepted
		1	Accepted

6.2.8 Failure reason

Failure reason information element shall define the reason of failure as defined in ETS 300 392-9 [6].

6.2.9 Interrogated subscriber address type

The interrogated subscriber address type information element shall indicate the type of interrogated subscriber identity element or elements that follow as defined in ETS 300 392-9 [6].

6.2.10 Interrogation result

Interrogation result shall indicate whether the previously made interrogation request was successful or unsuccessful. Interrogation result information element shall be as defined in table 19.

Table 19: Interrogation result contents

Information element	Length	Value	Remark
Interrogation result	1	0	Not accepted
		1	Accepted

6.2.11 Range type

See ETS 300 392-9 [6] for the encoding of this information element. It is optional to support services against a list or range referring to more than information element.

6.2.12 Service

Service information element shall indicate services as a bit map as defined in table 20. The bit value "0" shall indicate that the service is not applicable and the bit value "1" shall indicate that the service is applicable. If more than one service is applied then the values shall be added together e.g. value "11111_2" means all services.

Table 20: Service contents

Information element	Length	Value	Remarks
Services	5	00000_2	Reserved
		00001_2	Circuit mode speech
		00010_2	Circuit mode data
		00100_2	Packet mode data
		01000_2	SDS
		10000_2	Supplementary services management

7 SS-AP Functional Entity (FE) behaviour

The figures contained in this clause are intended to illustrate typical SS-AP specific FE behaviour in terms of information flows sent and received.

The behaviour of each FE is shown using the Specification and Description Language (SDL), see ITU-T Recommendation Z.100 [5]. Notice, however, that due to simplicity there are deviations from syntactical rules.

In the following figures output signals to the left represent information flows towards the user and output signals to the right represents information flows towards the SwMI part of the SS-AP function. Input signals from the left represent information from the user and input signals from the right represent information flows from the central part of the SwMI.

7.1 Behaviour of FE1

7.1.1 Protocol states of FE1

IDLE is the only state of FE1.

7.1.2 Procedures for FE1

In the IDLE state FE1 shall receive and respond to the assign requests concerning its ITSI family, which contains the ITSI and all valid GTSIs belonging to it. For signalling the SwMI may use any valid identity in the ITSI family. The MS shall use only the ITSI of the family. When a GTSI belongs to more than one ITSI family then the MS shall send only one acknowledgement, if the assignment is using group addressing and acknowledgement is requested.

At the reception of an SS-AP ASSIGN PDU, FE1 shall save the APL assignment to the database in the MS, if possible. If requested FE1 shall also send an ASSIGN ACK PDU to FE2 indicating whether the definition was accepted or if the request failed. If the definition was accepted and stored, FE1 shall also send an ASSIGN indication to the user application. The APL assignment shall be applied in the current SwMI from the moment it is received.

When migrating to a visited SwMI, FE1 shall save any APL assignment received and accepted in home SwMI and shall start to use default APLs unless FE2 in visited SwMI sends an assignment to FE1. Upon migration to home SwMI, FE1 shall revert to the SS-AP definition of home SwMI. In the absence of any explicit SS-AP definition, the MS shall apply the default APLs. The default APL to PDU priority mapping is described in ETS 300 392-2 [1], subclause 14.5.6.

Access priority is permanently activated in the SwMI with broadcast PDUs containing the information element "minimum priority". Access priority is permanently activated in the MS using either the default values or defined values. When an MS is attempting to send an uplink PDU by random access, it will compare the PDU priority (APL) with the minimum priority currently being broadcast by the SwMI to determine if the PDU may be sent. If the PDU priority is greater than or equal to the minimum priority then the MS is permitted to send the PDU, as described in clause 23 of ETS 300 392-2 [1].

User specific APLs assigned by SS-AP will apply to PDUs sent from CMCE, CONP and SCLNP but not to MM nor MLE PDUs. User specific APLs will not apply to the CMCE PDUs U-CALL RESTORE, U-DISCONNECT, U-RELEASE or U-TX CEASED, refer to ETS 300 392-2 [1], subclause 14.5.6.2, table 57. Furthermore, for the sending of U-SETUP, the user specific value for the low access priority level will be set 0 or decremented by 2 if it is 3 or more.

The signalling routes used by FE1 are detailed in figure 1. The protocol used in FE1 shall be as shown in figure 2.
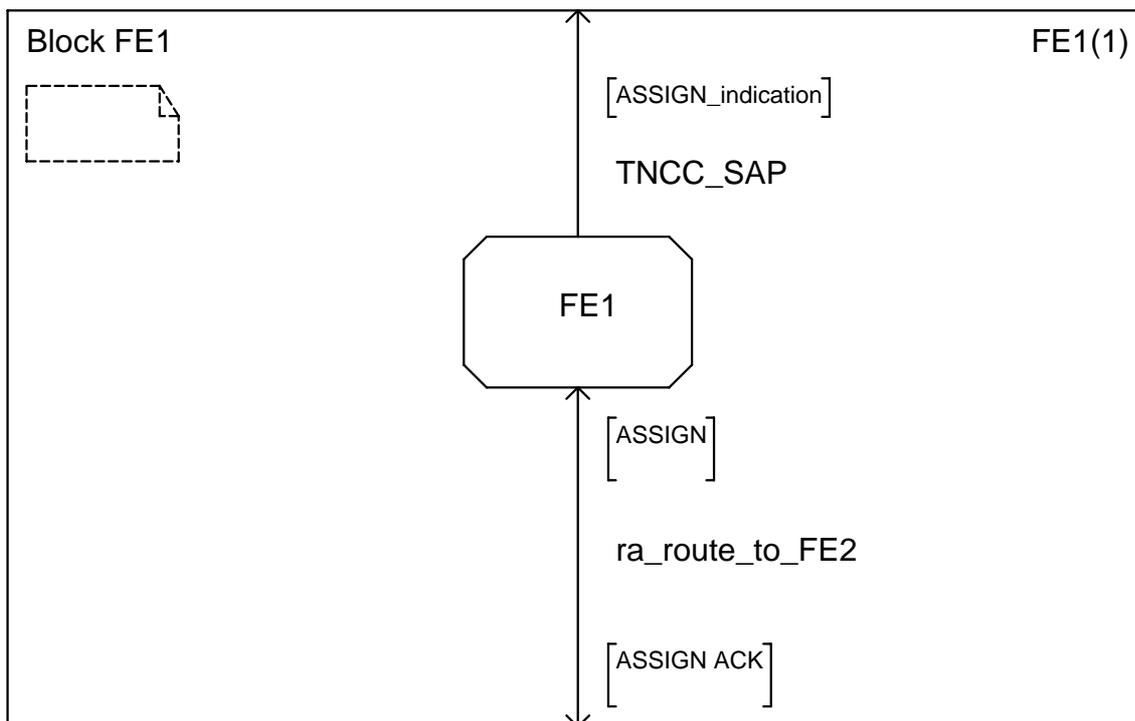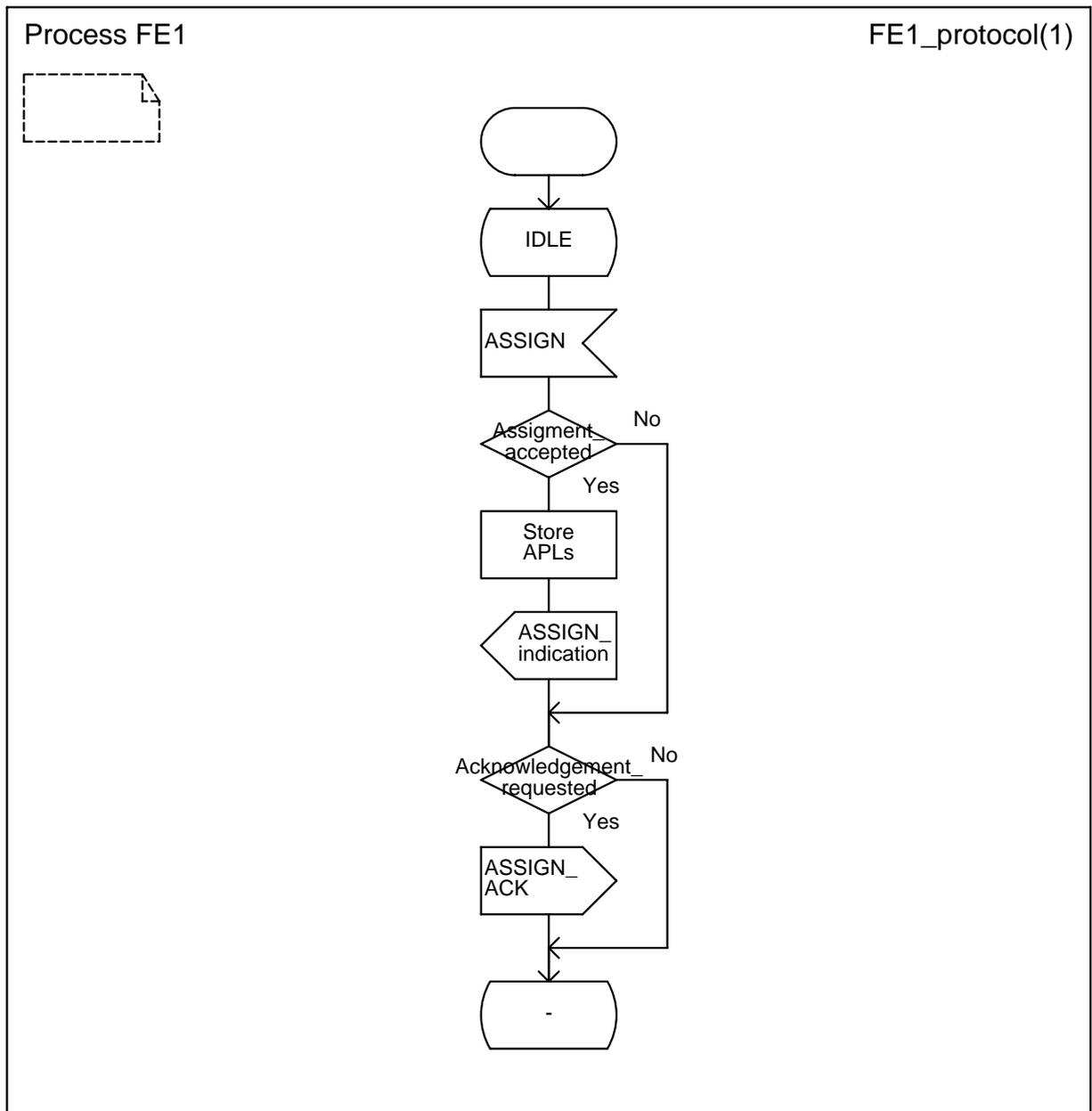

Figure 1: FE1 signal routes

Figure 2: FE1 protocol states

7.2 Behaviour of FE2

7.2.1 Protocol states of FE2

IDLE is the only state of FE2

7.2.2 Procedures for FE2

The protocol used in FE2 is shown in figure 4. There can be other variations of the protocol which may provide DEFINE ACK only after reception of ASSIGN ACK(s) from some or all of the served users. The details of those protocols are outside the scope of this ETS.

7.2.2.1 Verification

At the reception of SS-AP definition or interrogation request, FE2 shall verify that the request is authorized and that the parameters are in the correct range. FE2 may change the APL values if authorized user has defined values he is not allowed to define.

7.2.2.2 Definition and assignment in home SwMI

After making the checks, FE2 shall either continue to carry out the request, or reject it by sending an ASSIGN ACK PDU to FE3.

When the request is accepted FE2 shall locate the FE1(s), make the definition to the SwMI and the assignment request(s) to FE1(s).

When FE3 requests a definition for a subscriber identity range, the definition result , failure reason or services information can be different for different subscriber identities. In that case, FE2 shall send separate acknowledgements to FE3 for each different type of result. If, for example, the authorized user has requested the definition for a list of subscriber identities and the request is accepted for some subscriber identities but the request is rejected for the others, FE2 should send two separate acknowledgements back to FE3.

7.2.2.3 Definition over ISI

When FE2 in the home SwMI locates one or more users into visited SwMI or SwMIs it shall send a PROFILE update to the visited SwMI, if both the home and the visited SwMI support definition over ISI.

If the visited SwMI support definitions originating from the home SwMI of visited MS(s), then it may modify the APLs as appropriate for the visited SwMI. The visited SwMI shall send a PROFILE ACK to the home SwMI to confirm actual APL values or to reject the request. The visited SwMI shall then assign the APLs to MS(s) (FE1s) as described in subclause 7.2.2.2. The profile shall be exchanged as defined in ETS 300 392-3-5 [7].

> NOTE: Although absolute APLs values are exchanged between SwMIs that need not reflect that the same APL value in each system should provide the same quality of service.

Information exchange over ISI shall apply mechanisms defined in ETS 300 392-9 [6].

Transportation of DEFINE, DEFINE ACK, INTERROGATE and INTERROGATE ACK PDUs over ISI exchanged between FE3 in a visited SwMI and FE2 in the home SwMI shall use call unrelated information exchange as defined in ETS 300 392-9 [6].

7.2.2.4 Interrogation

Upon reception of an INTERROGATE PDU from FE3 the home SwMI FE2 will verify the authority of the request and shall fetch the interrogated data or reject the request. The home SwMI FE2 shall send the result in an INTERROGATE ACK PDU addressed to FE3.

When the authorized user (FE3) has interrogated the SS-AP for a subscriber identity range or list, and if the interrogation result, failure reason or services information are different for any of these identities, FE2 shall send separate INTERROGATE ACK PDUs to FE3.

The signalling routes used by FE2 are detailed in figure 3. The protocol used in FE2 shall be as shown in figure 4.
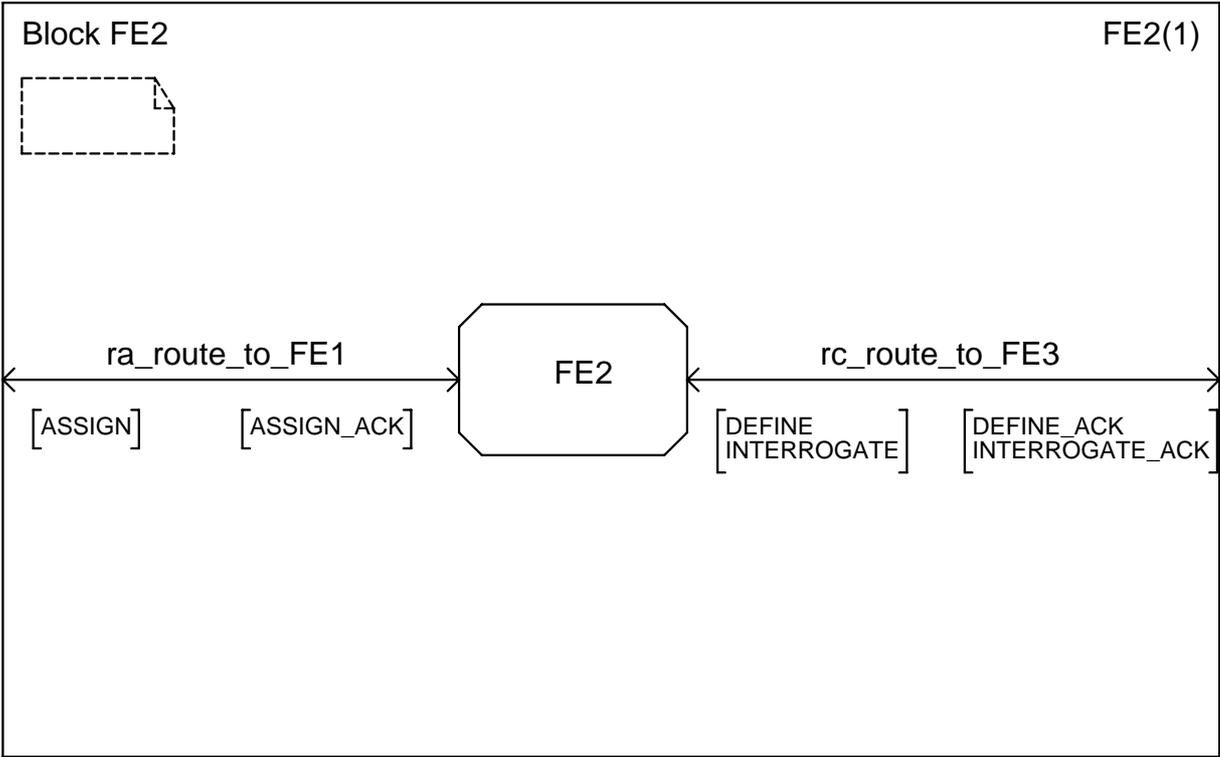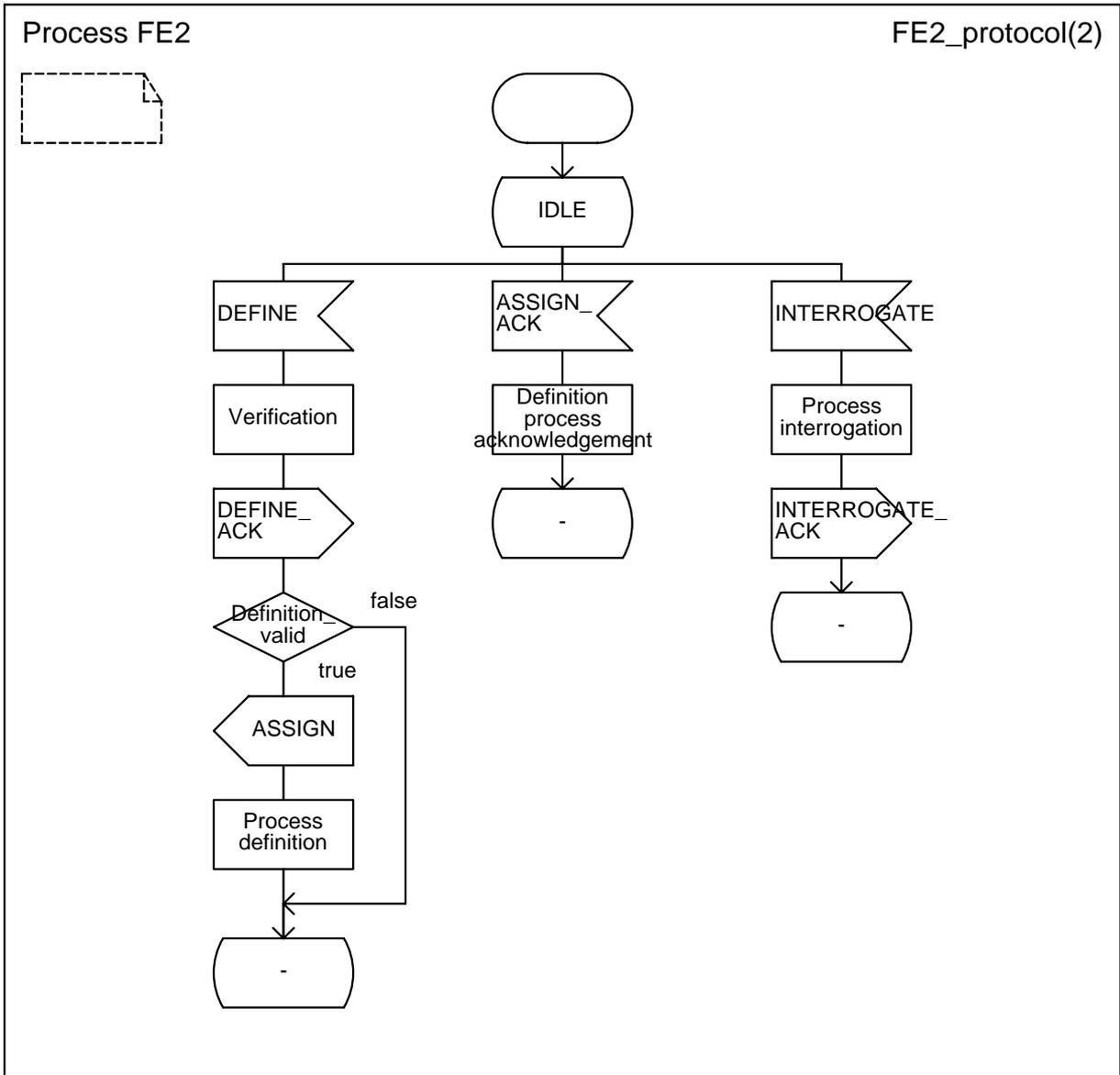
Figure 3: FE2 signal routes

Figure 4: FE2 protocol states

7.3 Behaviour of FE3

7.3.1 Protocol states of FE3

IDLE is the only state of FE3.

7.3.2 Definition and interrogation procedures for FE3

At the reception of SS-AP definition or interrogation request from user application, FE3 shall produce the corresponding DEFINITION/INTERROGATION PDU. FE3 shall send the DEFINITION/INTERROGATION PDU to FE2 in the served user SwMI.

Upon reception of a DEFINITION/INTERROGATION ACK PDU from FE2 FE3 shall pass it in the corresponding service primitive to the user application.

The signalling routes used by FE3 are detailed in figure 5. The protocol used in FE3 shall be as shown in figure 6.
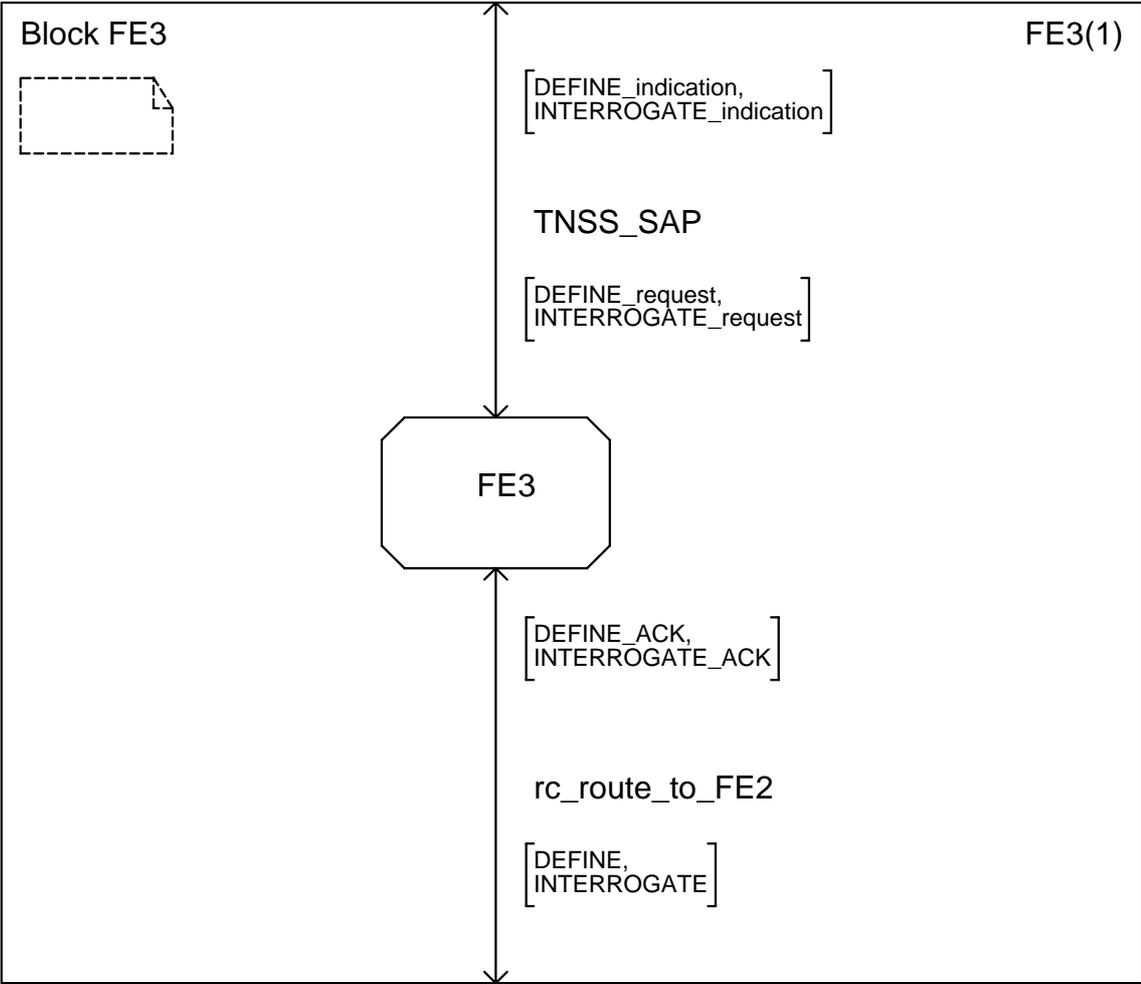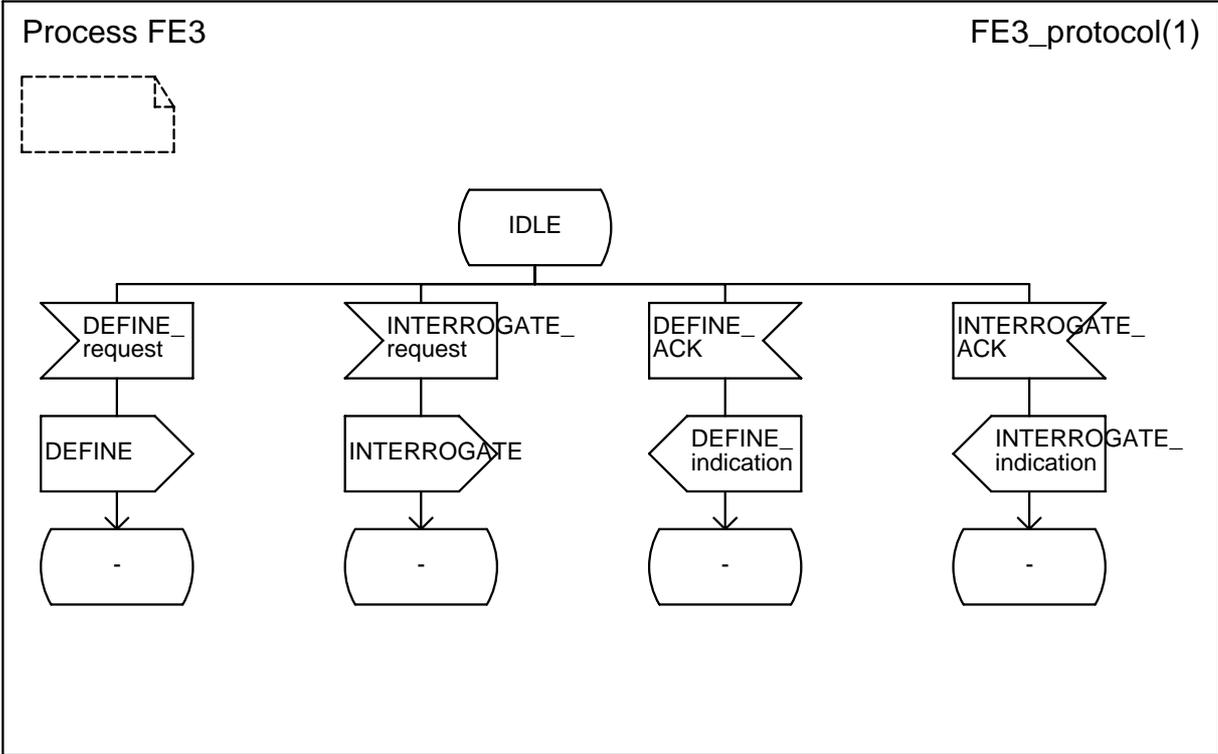
Block FE3   FE3(1)

DEFINE_indication,
INTERROGATE_indication

TNSS_SAP

DEFINE_request,
INTERROGATE_request

FE3

DEFINE_ACK,
INTERROGATE_ACK

rc_route_to_FE2

DEFINE,
INTERROGATE

Figure 5: FE3 signal routes

Process FE3   FE3_protocol(1)

IDLE

DEFINE_request   INTERROGATE_request   DEFINE_ACK   INTERROGATE_ACK

DEFINE   INTERROGATE   DEFINE_indication   INTERROGATE_indication

\-   -   -   -

Figure 6: FE3 protocol states

History

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