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Foreword

This draft European Telecommunication Standard (ETS) has been produced by the Radio Equipment and Systems (RES) Technical Committee of the European Telecommunications Standards Institute (ETSI), and is now submitted for the Public Enquiry phase of the ETSI standards approval procedure.

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-working", (DE/RES-06001-3).
- Part 4: "Gateways", (DE/RES-06001-4).
- Part 5: "Terminal equipment interface", (DE/RES-06001-5).
- Part 6: "Line connected stations", (DE/RES-06001-6).
- Part 7: "Security".
- Part 8: "Management services", (DE/RES-06001-8).
- Part 9: "Performance objectives", (DE/RES-06001-9).
- 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".
- Part 14: "PICS Proforma", (DE/RES-06001-14).
- Part 15: "Inter-working - Extended Operations", (DE/RES-06001-15).

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1 Scope

This ETS defines the stage 3 specifications of the Supplementary Service Priority Call (SS-PC) for the Trans-European Trunked Radio (TETRA).

The SS-PC enables a user to have preferential access to the network resources in the TETRA system in times of congestion. The SS-PC specifies the definition, activation, deactivation and interrogation for the usage of low, normal and high call priorities in the TETRA system. The operations are defined for the Switching and Management Infrastructure (SwMI), for the Mobile Station (MS) and for the Line Station (LS). SS-PC can be defined to subscribers of one TETRA system, but the subscribers can be located in several TETRA systems and the information flows can be delivered over the Inter System Interface (ISI). SS-PC can also be invoked for basic services within one TETRA system or for basic services that extend over ISI to several TETRA systems.

The pre-emptive priorities are outside of the scope of this ETS.

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

Supplementary Service 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 protocol 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 to the SwMI, for the MS and for the LS and can be applied over the ISI between TETRA systems.

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: "Radio Equipment and Systems (RES); Trans-European Trunked Radio (TETRA); Voice plus Data (V+D); Part 2: Air Interface (AI)".
- [2] ECMA Specification 142 (1990): "Specification, Functional Model and Information Flows for Control Aspects of Circuit Mode Basic Services in Private telecommunication Networks".
- [3] ETS 300 392-1: "Radio Equipment and Systems (RES); Trans-European Trunked Radio (TETRA); Voice plus Data (V+D); Part 1: General Network Design".
- [4] ETS 300 392-11-10: "Radio Equipment and Systems (RES); Trans-European Trunked Radio (TETRA); Voice plus Data (V+D); Part 11: Supplementary Services (SS) Stage 2; Part 11-10: Priority call (PC)".
- [5] ISO 8208 (1995): "Information technology - Data communications - X.25 Packet layer Protocol for Data Terminal Equipment".
- [6] ISO 8348 (1995): "Information processing systems - Data communications - Network service definition".
- [7] ISO 8878 (1995): "Use of X25 to provide the OSI connection mode network service".
- [8] CCITT Recommendation Z.100: "Specification and Description Language (SDL)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this ETS the following definitions apply:

authorized user: A user who is authorized to define, activate, deactivate and interrogate the SS-PC.

Functional Entity (FE): A FE specifies the functional characteristics of a party involved in the management or operation functions of SS-PC.

home system: A TETRA system to which the subscriber identity is permanently defined.

management functions: The management functions for SS-PC are definition, activation, deactivation and interrogation.

priority level: A pre-agreed value allocated to each mobile Individual TETRA Subscriber Identity (ITSI) or Group TETRA Subscriber Identity (GTSI) on a per call basis. It is used to determine priority access to network resources in the event of network congestion.

Switching and Management Infrastructure (SwMI): All of the TETRA equipment for a Voice plus Data (V+D) network except for subscriber terminals. The SwMI enables subscriber terminals to communicate with each other via the SwMI.

system 1: A TETRA system to which SS-PC is defined, activated, deactivated and interrogated and in which SS-PC can be invoked and operated.

system 2: A TETRA system through which SS-PC definition, activation, deactivation and interrogation can be delivered. SS-PC can also be invoked and operated in System 2.

user A: Calling party on which behalf authorized user has made SS-PC definition.

user B: Called party in a call in which SS-PC is operated.

3.2 Abbreviations

For the purposes of this ETS the following abbreviations apply:

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 ECMA Specification 142 [2].

GTSI	Group TETRA Subscriber Identity
ITSI	Individual TETRA Subscriber Identity
LS	Line Station
MS	Mobile Station
SDL	Specification and Description Language
SS	Supplementary Service

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

SS-PC	Priority Call
SS-PPC	Pre-emptive Priority Call
SwMI	Switching and Management Infrastructure
TETRA	Trans-European Trunked Radio

4 Supplementary Service Priority Call (SS-PC) stage 3 specification

4.1 Functional model

The functional model shall comprise the following Functional Entities (FEs):

- FE1 user A's functional entity;
- FE2 SS-PC functional entity for SS-PC definition, interrogation and operation;
 NOTE: FE2 is only applicable in system 2 for SS-PC operation.
- FE3 authorized user's functional entity;
- FE4 SS-PC generic functional entity in system 2;
- FE5 user B's functional entity.

The following relationships shall exist between these FEs:

- ra between FE1 and FE2;
- rb between FE2 and FE4 in different TETRA systems;
- rc between FE2 and FE3;
- rd between FE2 and FE5;
- re between FE1 and FE4;
- rf between FE4 and FE5;
- rg between FE3 and FE4;
- rh between FE2s in different TETRA systems.

Figure 1 shows these FEs and relationships for the management part and figure 2 for the operational part.

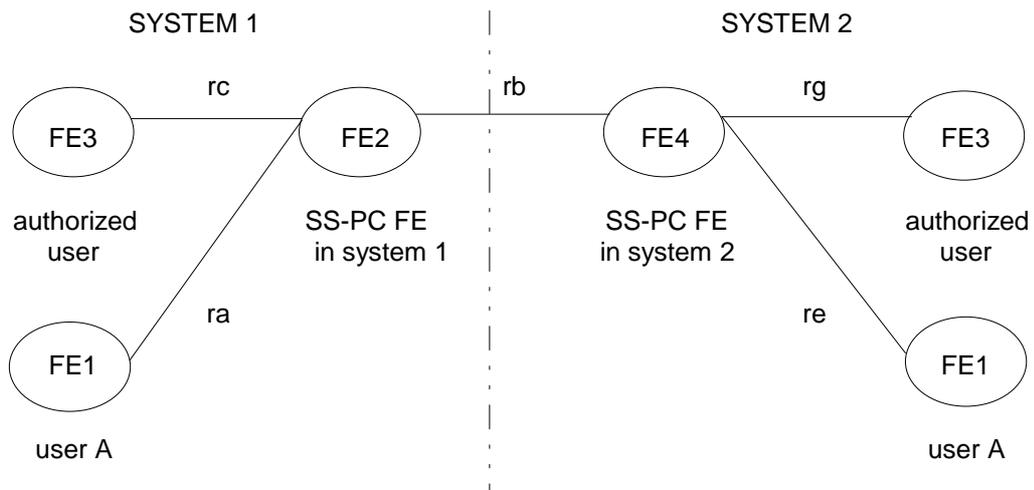


Figure 1: The relations and the FEs of the management part of SS-PC

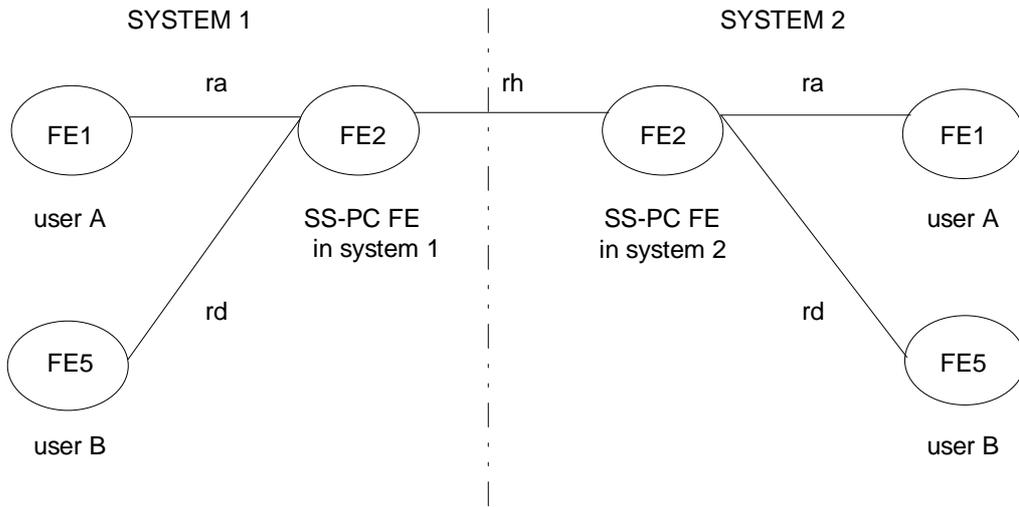


Figure 2: The relations and FEs of the operational part of SS-PC

4.1.1 Relationship with a basic service

FE1 may optionally be collocated with user A's CCA. This depends on whether FE1 is able to verify that the call priority is valid.

FE2 is collocated with CC in system 1 and system 2 as the FE2 verifies and determines the call priority for the service.

Figure 3 shows the different relationships that may exist between FEs and CC/CCA. The call priority is sent from user A to SwMI(s) and from SwMI to user A and user B(s) with the call invocation message. The SwMI should use the call priority for the resources it allocates for the call. These resources shall comprise of e.g. the radio link allocation, allocation of resources within SwMI and for the network connections over ISI. User A and user B should use the SS-PC priority to determine the importance of the call.

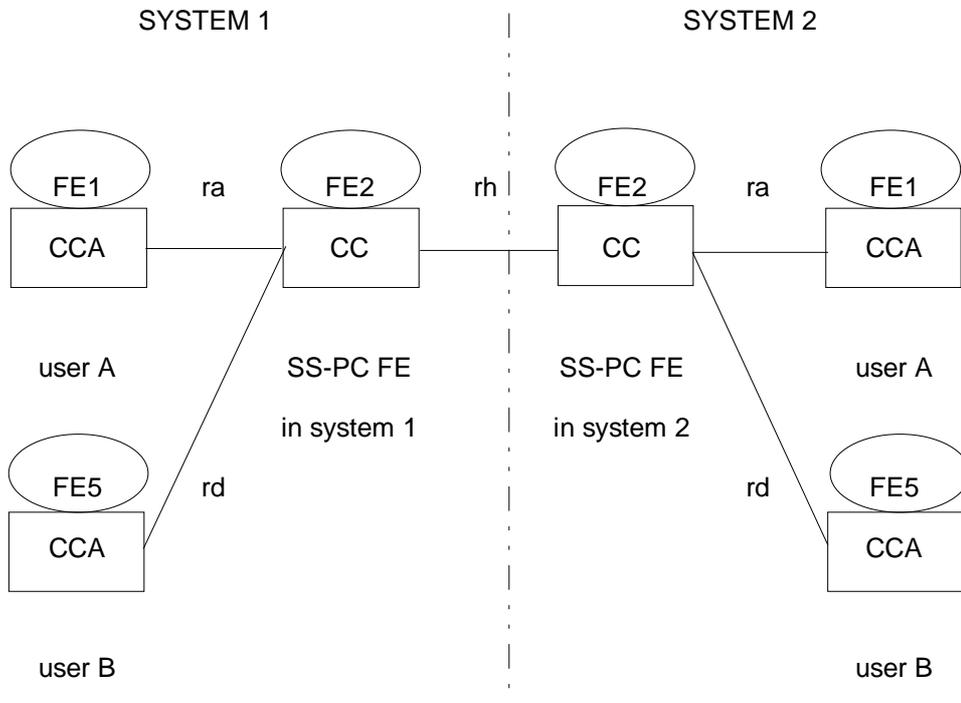


Figure 3: The relationships between the basic service and SS-PC FEs

4.2 Protocol structure and protocol stack

The SS-PC functionality within MS/LS and SwMI should take place in the following way:

- SS-PC definition, activation, deactivation and interrogation should be carried out in layer 3 by Supplementary Service sub-entity within CMCE in both the MS/LS and in the SwMI protocol stack;
- SS-PC invocation and operation for circuit mode basic services should be carried out by CC sub-entity within CMCE;
- SS-PC invocation and operation for connection-oriented packet mode data basic services should be carried out by Connection Oriented Network Protocol (CONP) sub-entity within layer 3.

The following ways can be used to deliver SS-PC information flows from one FE to another FE, as needed:

- from MS/LS to SwMI;
- from SwMI to another SwMI;
- from SwMI to MS/LS.

The information should flow in the following ways from one FE to another FE:

1) MS/LS sends information:

- in MS/LS the service primitive should be sent through the layer 3/application (layer) boundary to the sub-entity (SS, CMCE, CONP) and the sub-entity should process the information and convert it to PDU. The PDU should be sent down through layer 2/layer 3 service boundary to be sent to the peer layer 3 entity within SwMI;

NOTE: The layer 3/application (layer) service boundary for SwMI is not described in this ETS.

2) SwMI sends information:

- In SwMI the SS, CMCE or CONP sub-entity within layer 3 should process the information, convert it to PDU(s) and send the PDU down the layer 2/layer 3 service boundary to be sent to peer entity within MS/LS (or in another SwMI). The peer entity in layer 3 should receive the information in PDU through the layer 2/layer 3 service boundary. The peer entity should then process the data and if the peer entity is in MS/LS, it should provide the primitive to the application (layer) through the layer 3/application (layer) boundary.

This ETS is only normative for the protocol architecture and user application Service Access Points (SAPs) within the MS/LS but gives an informative description of the protocol and the SAPs within the SwMI.

5 SS-PC service description

5.1 General

This clause describes SS-PC specific services offered over of the TETRA V+D layer 3 service boundary from application to layer 3 or from layer 3 to application. The following SAPs shall be applied:

- SS SAP (TNSS-SAP):
 - applied for the SS-PC definition, activation, deactivation and interrogation;
- CC SAP (TNCC-SAP):
 - applied for SS-PC invocation and operation of circuit mode basic service;
- Connection-oriented packet mode data SAP (TNCO-SAP):
 - applied for SS-PC invocation and operation of connection-oriented packet mode data service.

In case of invocation and operation of SS-PC for circuit mode basic service or connection-oriented packet mode data service, the basic call service primitives should be used to convey the SS-PC invocation and operation arguments.

The specific TNSS service primitives related to SS-PC shall be carried as arguments within the following three general generic SS primitives:

- a) TNSS-SERVICE;
- b) TNSS-INFO;
- c) TNSS-ERROR.

For a detailed description of the generic SS primitives, see ETS 300 392-2 [1], subclause 12.3.

The TNSS-SERVICE shall enable an invoking entity to request and to be informed of an operation to be performed by the performing entity.

The TNSS-INFO shall enable an entity to be informed of ongoing transactions.

The TNSS-ERROR shall enable a performing entity to return the negative reply of a unsuccessfully performed operation to the invoking entity.

5.1.1 SS-PC services offered over the TNSS-SAP

5.1.1.1 SS-PC primitives

The primitives shall as operation arguments contain the following SS-PC sub-arguments:

- a) DEFINE request;
- b) DEFINE-ACK confirm;
- c) DEFINE-USER indication;
- d) DEFINE-USER-ACK response;
- e) INTERROGATE request;
- f) INTERROGATE-ACK confirm.

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

- Remark: comment.

5.1.1.2 DEFINE request

DEFINE request primitive shall be offered from application to FE3 over TNSS-SAP. The primitive shall contain the SS-PC information elements listed in table 1.

If the defined subscriber number is repeated, the definition(s) shall apply to all listed subscriber numbers.

The element defined subscriber number shall be repeated if this is indicated in the element defined subscriber type. If repeated, it should be interpreted as a range of numbers or as a list of numbers according to defined subscriber type. A list can contain up to ten numbers; with a range the first and last number of the range is given.

If the basic service type appears several times, high and/or low priority value element should apply to all preceding basic service types, e.g. allowed priority value apply to two different basic service types if the following elements appear in DEFINE request:

basic service type₁ + basic service type₂ + high priority value₁ + low priority value₂.

The high priority value and low priority value shall contain a range of priority values. Only the highest value of the range shall be given. The lower limit for low priority value shall be the lowest possible value (0) and the upper limit shall be the highest value of the range. The lower limit for high priority value shall be the lowest non-low priority value. The highest value shall be the highest value of the range. The highest value of each range shall be used as default for high/low priority, e.g. if the high priority value is defined to have the value 8 and the low priority value is defined the value 3, the values for high priority value are from four to eight and eight is used as default, the values for low priority value are from zero to three and three is used as default.

The combinations of elements basic service type and high priority value/low priority value can appear several times in DEFINE request in order to allow different priority value definitions for different basic service types, e.g. the elements can appear in the following way:

basic service type₁ + high priority value₁ + low priority value₂;
basic service type₂ + high priority value₃ + low priority value₄.

The element basic service type can be repeated within the combinations.

The SS-PC service can be activated/deactivated with the information flow in the SwMI. The SS-PC can only be operated if activated.

Table 1: DEFINE request contents

Element	Req/Ind	Remark
SS type	M	:= SS-PC
Operation type	M	:= definition
Defined subscriber type	M	
Defined subscriber number	M	repeatable
Activated/deactivated	M	
Basic service type	C	repeatable
High priority value	C	repeatable
Low priority value	C	repeatable
Delivered to user A(s)	M	MS/LS-subscribers
Acknowledgement from user A(s)	M	Acknowledgement for the definition request

5.1.1.3 DEFINE-ACK confirm

DEFINE-ACK confirm primitive shall be offered from FE3 to application over TNSS-SAP as an acknowledgement to a previously made definition request. The primitive shall contain the SS-PC information elements listed in table 2.

If the defined subscriber type contains several subscriber numbers, the result for definition(s) shall apply to all listed subscriber numbers and basic service types.

The element defined subscriber number shall be repeated if this is indicated in the element defined subscriber type. If repeated, it should be interpreted as a range of numbers or as a list of numbers according to defined subscriber type. A list can contain up to ten numbers; with a range the first and last number of the range is given.

If the basic service type appears several times, result for definition element should apply to all preceding basic service types, e.g. result for definition apply to two different basic service types if the following elements appear in DEFINE-ACK primitive:

basic service type₁ + basic service type₂ + result for definition.

NOTE: If the acknowledgements are different for different "defined subscriber numbers" FE3 delivers several DEFINE-ACK primitives to application.

Table 2: DEFINE-ACK confirm contents

Element	Req/Ind	Remark
SS type	M	:= SS-PC
Operation type	M	:= definition
Defined subscriber type	M	
Defined subscriber number	M	repeatable
Basic service type(s)	M	repeatable
Result for definition	M	repeatable

5.1.1.4 DEFINE-USER indication

DEFINE-USER indication primitive shall be offered from FE1 to application over TNSS-SAP if FE1 saves the definition. It is an optional feature to FE1 to be able to save the SS-PC definitions. The primitive shall contain the SS-PC information elements listed in table 3.

If the defined subscriber type contains several subscriber numbers, the definition(s) shall apply to all listed subscriber numbers.

The element defined subscriber number shall be repeated if this is indicated in the element defined subscriber type. If repeated, it should be interpreted as a range of numbers or as a list of numbers according to defined subscriber type. A list can contain up to ten numbers; with a range the first and last number of the range is given.

If the basic service type appears several times, high and/or low priority value element should apply to all preceding basic service types, e.g. allowed priority value apply to two different basic service types if the following elements appear in DEFINE-USER primitive:

basic service type₁ + basic service type₂ + high priority value₁ + low priority value₂.

The high priority value and low priority value shall contain a range of priority values. Only the highest value of the range shall be given. The lower limit for low priority value shall be the lowest possible value (0) and the upper limit shall be the highest value of the range. The lower limit for high priority value shall be the lowest non-low priority value. The highest value shall be the highest value of the range. The highest value of each range shall be used as default for high/low priority; e.g. if the high priority value is defined to have the value 8 and the low priority value is defined the value 3, the values for high priority value are from four to eight and eight is used as default, the values for low priority value are from zero to three and three is used as default.

The combinations of elements basic service type and high priority value/low priority value can appear several times in DEFINE-USER request in order to allow different priority value definitions for different basic service types, e.g. the elements can appear in the following way:

basic service type₁ + high priority value₁ + low priority value₂;

basic service type₂ + high priority value₃ + low priority value₄.

The element basic service type can be repeated within the combinations.

Table 3: DEFINE-USER indication contents

Element	Req/Ind	Remark
SS type	M	:= SS-PC
Operation type	M	:= distribution
Defined subscriber type	M	
Defined subscriber number	M	repeatable
Basic service type(s)	M	repeatable
High priority value	C	repeatable
Low priority value	C	repeatable
Acknowledgement from user A(s)	O	Ack. to definition request.

5.1.1.5 DEFINE-USER-ACK response

DEFINE-USER-ACK response primitive shall be offered from application to FE1 over TNSS-SAP as an acknowledgement to a previously received DEFINE-USER request, if acknowledgement was requested. The primitive shall contain the SS-PC information elements listed in table 4.

If the defined subscriber type contains several subscriber numbers, the result for definition(s) shall apply to all listed subscriber numbers and basic service types.

NOTE: If the acknowledgements are different for different "defined subscriber numbers" FE3 delivers several DEFINE-USER-ACK response primitives to application.

Table 4: DEFINE-USER-ACK response contents

Element	Req/Ind	Remark
SS type	M	:= SS-PC
Operation type	M	:= distribution
Defined subscriber type	M	
Defined subscriber number	M	repeatable
Result for definition	M	repeatable

5.1.1.6 INTERROGATE request

INTERROGATE request primitive shall be offered from application to FE3 over TNSS-SAP when authorized user makes an interrogation request. INTERROGATE request primitive shall contain the SS-PC information elements listed in table 5.

If the interrogated subscriber type contains several subscriber numbers, the definition(s) shall apply to all listed subscriber numbers.

The element interrogated subscriber number shall be repeated if this is indicated in the element interrogated subscriber type. If repeated, it should be interpreted as a range of numbers or as a list of numbers according to interrogated subscriber type. A list can contain up to ten numbers; with a range the first and last number of the range is given.

Table 5: INTERROGATE request contents

Element	Req/Ind	Remark
SS type	M	:= SS-PC
Operation type	M	:= interrogation
Interrogated subscriber type	M	
Interrogated subscriber number	M	repeated

5.1.1.7 INTERROGATE-ACK confirm

INTERROGATE-ACK confirm primitive shall be offered from FE3 to application over TNSS-SAP as a response to a previously sent interrogation request. INTERROGATE-ACK indication primitive shall contain the SS-PC information elements listed in table 6.

If the interrogated subscriber type contains several subscriber numbers, the definition(s) shall apply to all listed subscriber numbers.

The element interrogated subscriber number shall be repeated if this is indicated in the element interrogated subscriber type. If repeated, it should be interpreted as a range of numbers or as a list of numbers according to interrogated subscriber type. A list can contain up to ten numbers; with a range the first and last number of the range is given.

If the basic service type appears several times, high and/or low priority value element should apply to all preceding basic service types, e.g. allowed priority value apply to two different basic service types if the following elements appear in INTERROGATE-ACK confirm:

basic service type₁ + basic service type₂ + high priority value₁ + low priority value₂.

The high priority value and low priority value shall contain a range of priority values. Only the highest value of the range shall be given. The lower limit for low priority value shall be the lowest possible value (0) and the upper limit shall be the highest value of the range. The lower limit for high priority value shall be the lowest non-low priority value. The highest value shall be the highest value of the range. The highest value of each range shall be used as default for high/low priority; e.g. if the high priority value is defined to have the value 8 and the low priority value is defined the value 3, the values for high priority value are from four to eight and eight is used as default, the values for low priority value are from zero to three and three is used as default.

The combinations of elements basic service type and high priority value/low priority value can appear several times in INTERROGATE-ACK indication in order to allow different priority value definitions for different basic service types. E.g. the elements can appear in the following way:

basic service type₁ + high priority value₁ + low priority value₂;

basic service type₂ + high priority value₃ + low priority value₄.

The element basic service type can be repeated within the combinations.

NOTE: If definitions/responses are different for different "interrogated subscriber numbers" FE3 sends several INTERROGATE-ACK confirm primitives to application.

Table 6: INTERROGATE-ACK confirm contents

Element	Req/Ind	Remark
SS type	M	:= SS-PC
Operation type	M	:= interrogation
Interrogated subscriber type	M	
Interrogated subscriber number	M	repeatable
Result for interrogation	M	note 1
Activated/deactivated	M	note 2
Basic service type	C	repeatable, note 2
High priority value	C	repeatable, note 2
Low priority value	C	repeatable, note 2
Delivered to user A(s)	O	MS/LS-subscribers, note 2
Acknowledgement from user A(s)	O	note 2
NOTE 1: If the interrogation request failed, the reason is specified here.		
NOTE 2: The element appears only if the "result for interrogation" has the value "accepted" or "accepted but request to one or more user As pending in SwMI".		

5.1.2 SS-PC services offered over the TNCC-SAP

The SS-PC definition should be applied in the following way, if SS-PC is defined for user A's MS/LS:

- the SS-PC definition for user A should be applicable, when user A invokes a point-to-point basic service;
- the SS-PC definition for a group identity should be applicable, when user A invokes a point-to-multipoint basic service to the defined group identity.

5.1.2.1 CALL PRIORITY - invocation and operation for circuit mode basic services

CALL PRIORITY applied for circuit mode basic services shall be offered over TNCC-SAP with TNCC-SETUP primitives. The parameter shall be used in the following way:

- TNCC-SETUP request:
 - if user A applies SS-PC with call invocation, call priority shall indicate the requested priority value. Application shall verify that the value is within correct range before passing it down over TNCC-SAP;

- TNCC-SETUP confirm:
 - after SwMI has invoked the call, if SwMI has changed the call priority, application within user A shall apply the new priority value for the call and the application should indicate the priority to the service user;
- TNCC-SETUP indication:
 - after SwMI has invoked the call, application shall apply call priority for the call within user B(s). The application should indicate the priority to the service user.

NOTE: In ETS 300 392-11-10 [4] OPERATE1 information flow describes SS-PC invocation and OPERATE2 the SS-PC operation. OPERATE1 refers to CALL PRIORITY in TNCC-SETUP request and OPERATE2 refers to CALL PRIORITY in TNCC-SETUP confirm and TNCC-SETUP indication.

5.1.3 SS-PC services offered over the TNCO-SAP

5.1.3.1 PRIORITY - invocation and operation for connection-oriented packet mode data service

PRIORITY applied for connection-oriented packet mode data service shall be offered over TNCO-SAP with all applicable TNCO primitives containing priority element as sub-element of Quality of Service (QoS), see ETS 300 392-2 [1], clause 24.

If the priority is requested and if the SS-PC definition for user A has been saved within MS/LS, the application of the party that requests a certain priority level, should verify that the requested priority is within the allowed range. In case of point-to-point call, the priority defined for the user that requests the priority should indicate the allowed values; in case of point-to-multipoint call, the priority defined for the group should indicate the allowed values.

The priorities applied for connection-oriented packet mode data service shall be applied as described in IS/IEC 8202. However, the requested priority should be within the defined limits.

NOTE: OPERATE1 and OPERATE2 information flows given in ETS 300 392-11-10 [4] refer to PRIORITY element for connection-oriented packet mode data service. OPERATE1 refers to priority in uplink and OPERATE2 to priority in downlink.

5.1.4 Primitive descriptions

acknowledgement from user A(s) =

- 0 acknowledgement requested from user A(s)
- 1 acknowledgement not requested from user A(s)

basic service type(s) =

- 0 all applicable basic services (circuit mode speech, circuit mode data, packet mode data (connection-oriented))
- 1 circuit mode speech
- 2 circuit mode data
- 3 packet mode data (connection-oriented)

defined subscriber number =

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

defined subscriber type =

- 0 subscriber number, 1 subscriber number following
- 1 range of numbers, 2 subscriber numbers following
- 2 list of subscriber numbers, 2 subscriber numbers following
- 3 list of subscriber numbers, 3 subscriber numbers following
- 4 list of subscriber numbers, 4 subscriber numbers following
- 5 list of subscriber numbers, 5 subscriber numbers following
- 6 list of subscriber numbers, 6 subscriber numbers following
- 7 list of subscriber numbers, 7 subscriber numbers following
- 8 list of subscriber numbers, 8 subscriber numbers following
- 9 list of subscriber numbers, 9 subscriber numbers following
- 10 list of subscriber numbers, 10 subscriber numbers following

delivered to user A(s) =

- 0 delivered
- 1 not delivered

high priority value (for all circuit mode basic services) =

- 0 0
- 1 1
- 2 2
-
- 11 11

high priority value (for connection-oriented packet mode data service) =

- 0 0
- 1 1
- 2 2
-
- 13 13
- 14 14 (should be recognized as emergency value)

interrogated subscriber number:

see defined subscriber number.

interrogated subscriber type:

see defined subscriber type.

low priority value (for all circuit mode basic services):

see high priority value (for all circuit mode basic services).

low priority value (for connection-oriented packet mode data service):

see high priority value (for connection-oriented packet mode data service).

result for activation =

- 0 accepted
- 1 request failed for any reason
- 2 user not authorized
- 3 unknown TETRA identity
- 4 parameters not valid
- 5 insufficient information

result for deactivation =

see result for activation

result for definition =

- 0 accepted by SwMI (from FE3 to application)/ accepted by MS (from FE1 to application)
- 1 accepted but some priority values changed by SwMI
- 2 one or more user As could not accept the request/one or more user As where not reached
- 3 request failed for any reason
- 4 user not authorized
- 5 unknown TETRA identity
- 6 parameters not valid
- 7 insufficient information

result for interrogation =

- 0 accepted
- 1 accepted but request pending in SwMI to one or more user As
- 2 one or more user As could not accept the request/one or more user As where not reached
- 3 SS-PC not defined for the given identity
- 4 request failed for any reason
- 5 user not authorized
- 6 unknown TETRA identity
- 7 parameters not valid

5.1.5 Mapping of SS-PC primitives to TNSS primitives

SS-PC primitives shall be mapped by FEs to TNSS-SERVICE, TNSS-INFO and TNSS-ERROR primitives according to table 7.

Table 7: Mapping of the SS-PC primitives to TNSS primitives

SS-PC Primitive	TNSS-SERVICE request	TNSS-SERVICE confirm	TNSS-SERVICE indication	TNSS-ERROR indication
DEFINE	in FE3	-	-	note
DEFINE-ACK	-	in FE3	-	note
DEFINE-USER	in FE1	-	-	note
DEFINE-USER-ACK	-	in FE3	-	note
INTERROGATE	in FE3/FE1	-	-	note
INTERROGATE-ACK	-	in FE3	-	note
NOTE: FE1/FE3 should include a primitive received from application or from FE2/FE4 in TNSS-ERROR indication if FE1/FE3 cannot recognize or accept the primitive.				

6 SS-PC protocol description

6.1 SS-PC protocol states

The normal SS-PC protocol states are described below.

Generally in MS/LS, when a FE receives the SS-PC information from SwMI, it receives a PDU and it shall convert the information to primitive before giving it to application; when FE receives a SS-PC information flow from application it should receive the primitive which it should convert to PDU, which the FE shall send to SwMI.

6.1.1 Protocol states of FE1

The capability to receive, save and acknowledge SS-PC definitions is an optional feature within a MS/LS. The state definitions given below shall apply only if the feature is supported.

6.1.1.1 State IDLE

State IDLE is the normal state of FE1. In the state IDLE FE1 shall:

- receive SS-PC definition requests from SwMI and pass them to application (layer);
- receive acknowledgements to SS-PC definition requests from application and send them to SwMI.

6.1.2 Protocol states of CCA to which FE1 is collocated

The state descriptions below specify the invocation of SS-PC but the call setup procedure itself is outside the scope of this ETS.

6.1.2.1 State IDLE

CCA to which FE1 is collocated shall be able to receive call invocation requests including the SS-PC invocation (priority) from the application. The requested priority shall be sent to SwMI with the call invocation request.

6.1.2.2 MO_CALL_SETUP

At the reception of the call set-up confirmation, CCA should give the priority to the application in order to indicate the invoked (operated) priority to the service user. SwMI can have changed the priority.

6.1.3 Protocol states of FE2

6.1.3.1 State IDLE

IDLE should be the normal state of FE2. In this state FE2 should receive the definition or interrogation requests from FE3/FE1.

In case of definition request, FE2 should verify the request. If FE2 finds the request valid and authorized, FE2 should accept it, save the definition to the database in SwMI and send an acknowledgement to FE3. If FE3 requested the definition to be made to user B(s) and if FE2 accepted the definition request, FE2 should start timer T1 to supervise the sending of definition requests to FE1(s), send the request(s) to FE1(s) and move to WAIT-FOR-ACK state.

In case of interrogation, if FE2 founds no reason to bar the interrogation request, FE2 should fetch the interrogated data and send it to FE3/FE1.

6.1.3.2 State WAIT-FOR-ACK

In WAIT-FOR-ACK state FE2 should wait for the response(s) from FE1(s). When FE1(s) has (have) acknowledged the request or if the timer T1 expires, FE2 should return to state IDLE.

NOTE: As an operator option, FE2 may keep the definition requests in SwMI if any of the FE1(s) is not reachable and send them later, if one or more FE1s cannot be reached or has (have) not acknowledged the request.

6.1.4 Protocol states of CC to which FE2 is collocated

6.1.4.1 ANY-STATE in which CC is able to set-up a call

CCA to which FE2 is collocated should receive call invocation requests including the priority from user A. CC should check the priority and if it finds it valid should set-up the call using the requested priority.

The SS-PC definition should be applied in the following way, if SS-PC is defined and if the user A invokes SS-PC with the basic service request:

- the SS-PC definition for user A should be applicable, when user A invokes a point-to-point basic service;
- the SS-PC definition for a group identity should be applicable, when user A invokes a point-to-multipoint basic service to the defined group identity and if user A is a member of the called group.

However, FE2 can change the requested call priority, if:

- the requested priority was not authorized;
- if the call extends to several TETRA systems, FE2 of each system shall be able to select the applied call priority in that system;
- as operator option, FE2 may always change the requested priority, e.g. due to congestion.

As network option, FE2 may invoke and operate SS-PC on behalf of user A, if SS-PC has been activated only within the SwMI.

If CC finds a reason to change the priority it should do it. FE2 should indicate the priority used for the to user A and user B(s) in the appropriate call set-up PDUs. This shall apply to both circuit mode basic services and connection-oriented packet mode data calls. The call invocation itself is described in ETS 300 392-1 [3] and ETS 300 392-2 [1].

6.1.5 Protocol states of FE3

6.1.5.1 State IDLE

State IDLE is the normal state of FE3. In the state IDLE FE1 shall:

- receive SS-PC definition requests from SwMI and pass them to application (layer);
- receive acknowledgements to SS-PC definition requests from application and send them to SwMI.

6.1.6 Protocol states of FE4

6.1.6.1 State IDLE

IDLE should be the normal and only state of FE4. In this state FE4 should receive the definition and interrogation information flows from FE3 (FE1) to be delivered to FE2 in another system. And FE4 should also receive the information flows from FE2 to be delivered to FE1 or FE3 located in this system.

6.1.7 Protocol states of CCA collocated to FE5

6.1.7.1 ANY-STATE in which CCA is able to set-up a call

CCA to which FE5 is collocated shall be able to receive call set-up indications with priority indicating the priority applied for the call. The applied priority should be sent to application with the call set-up indication and the application can show the priority to the user.

6.2 Procedures

The normal SS-PC procedures are described below.

6.2.1 Procedures for FE1

No procedures for FE1.

6.2.2 Procedures for FE2

6.2.2.1 Verification in FE2

At the reception of SS-PC definition or interrogation request, FE2 should verify that the request is authorized and that the parameters are in the correct range. After making the checks, FE2 either continues to carry out the request, or rejects it.

If a definition is requested for a subscriber number range or a list of subscriber numbers, the "result for definition" can be different for different subscriber numbers. In that case, FE2 should send separate acknowledgements (FACILITY elements) to FE3. If e.g. the user has requested the definition for a list of two subscriber numbers, and the request is accepted for one subscriber number but the request is rejected for the other, FE2 should send two separate acknowledgements back to FE3.

The definition shall be applied from the moment it is made.

6.2.2.2 Definition in FE2

FE2 locates the FE1(s), makes the definition to the SwMI and the definition request(s) to FE1(s).

FE2 should construct the SS-PC definition (DEFINE) PDU for user A according to the authorized user's request. FE2 may, however, change the priority values if authorized user has defined values he is not allowed to define. The definition can be made to:

- one subscriber or group number;
- a list of subscriber or group numbers;
- a range of subscriber or group numbers.

The priority can be defined to have different values for different basic services.

User A (FE1s) should acknowledge the definition request with DEFINE-USER-ACK, if requested.

6.2.2.3 Interrogation in FE2

FE2 should fetch the interrogated data in order to send it to FE3.

FE2 should construct the SS-PC interrogation (INTERROGATE) elements for authorized user according to the user's request. The user can interrogate the defined priority value for low and high of:

- one subscriber or group number;
- a list of subscriber or group numbers;
- a range of subscriber or group numbers.

The priority value can be defined to have different values for different basic services. All defined values should be included in the INTERROGATE-ACK.

If the user has interrogated the SS-PC for a subscriber number range or list, and if any of the parameters listed below are different for any of these numbers, FE2 should send separate INTERROGATE-ACK flows to FE3:

- result for interrogation;
- number of basic service definitions;
- number of basic services;
- basic services;
- priority for the basic service(s).

6.2.3 Procedures for CC to which FE2 is collocated

6.2.3.1 Verification of priority in CC to which FE2 is collocated

CC should verify the requested priority and change the value of it, if needed.

6.2.4 Procedures for FE3

6.2.4.1 Verification in FE3

At the reception of SS-PC definition or interrogation request from user application, FE3 shall verify the parameters and if it finds them suitable, it shall produce the definition/interrogation request according to request received from application. FE3 shall make the PDUs according to the descriptions in subclauses 6.5 and 6.6. FE3 shall send the definition/interrogation request to FE2. If FE3 barred the definition locally, FE3 shall send an indication to the application.

FE3 shall construct the SS-PC definition (DEFINE) SS-FACILITY element according to the user's request. The definition can be made to:

- one subscriber or group number;
- a list of subscriber or group numbers;
- a range of subscriber or group numbers.

The authorized user can define different priority values for different basic services.

FE3 shall construct the SS-PC interrogation (INTERROGATE) SS-FACILITY element for authorized user according to the user's request. The user can interrogate the defined priority values:

- one subscriber or group number;
- a list of subscriber or group numbers;
- a range of subscriber or group numbers.

6.2.5 Procedures for FE4

6.2.5.1 Routing address in FE4

If FE4 receives any information flow, that should be routed over the ISI to another TETRA system, FE4 adds the routing address to the request. If FE4 receives any information flow from another TETRA system over the ISI, FE4 should deliver the request to FE1/FE3 located in the same system (as FE4).

6.3 Protocol timers

6.3.1 Protocol timers for FE2

FE2 should use timer T1 to supervise the time it waits for acknowledgements from FE1(s) after FE2 has sent the definition requests to FE1(s).

6.4 PDU Descriptions

The SS-FACILITY, call priority or priority elements shall be used to convey the supplementary service information to and from MS/LS and over the ISI. SS-FACILITY element can be transported in any call control PDU if inside a call or in a D/U-FACILITY PDU. The call priority element applied for circuit mode basic service operation and invocation shall be conveyed in U/D-SETUP and D-CONNECT PDU. The priority element applied for packet mode data service shall be conveyed in any packet mode data PDU containing the priority element, see ETS 300 392-2 [1], clause 25. The element coding used for SS-PC is in accordance with the general rules specified in ETS 300 392-2 [1], clause 14.

The element coding for SS-PC is detailed in the following clauses.

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

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

NOTE: The elements that follow the "defined/interrogated subscriber numbers" in the PDU shall be valid for all the given "defined/interrogated subscriber numbers".

6.4.1 DEFINE

DEFINE information flow shall be sent from FE3 to FE2. The flow shall be offered from FE3 to FE4 only if FE3 is in another TETRA system.

DEFINE shall contain the SS-PC information elements listed in table 8.

Table 8: DEFINE PDU contents

Element	Length	Type	C/O/M	Value	Remark
SS-type	6	1	M		:= PC := 011011 ₂
Action type	4	1	M		:= definition := 0001 ₂
Defined subscriber type	4	1	M		
Defined subscriber number	48	1	C		(note)
Activated/deactivated	1	1	M	0	activated
				1	deactivated
Number of basic service definitions	3	1	M		
Number of basic services	3	1	C		(note)
Basic service(s)	3	1	C		(note)
High priority value	4	1	C		
Low priority value	4	1	C		
Delivered to user A(s)	1	1	M	0	To be delivered
				1	Not to be delivered
Acknowledgement from user A(s)	1	1	M	0	Acknowledgement requested
				1	Acknowledgement not requested

NOTE: Element shall be repeatable and it shall appear at least once.

6.4.2 DEFINE-ACK

DEFINE-ACK information flow shall be offered from FE2 to FE3. The flow shall be offered from FE4 to FE2 only if FE3 is in another TETRA system.

NOTE: If the acknowledgements are different for different "defined subscriber numbers" FE2 shall send several DEFINE1 acknowledgements to FE2 (FE4).

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

Table 9: DEFINE-ACK PDU contents

Element	Length	Type	C/O/M	Value	Remark
SS-type	6	1	M		:= PC := 011011 ₂
Action type	4	1	M		:= definition := 0001 ₂
Defined subscriber type	4	1	M		
Defined subscriber number	48	1	C		(note)
Result for definition	3	1	M		
Number of basic service definitions	3	1	C		
Number of basic services	3	1	C		(note)
Basic service(s)	3	1	C		(note)

NOTE: Element shall be repeatable and it shall appear at least once.

6.4.3 DEFINE-USER

DEFINE-USER information flow shall be offered from FE2 to FE1. The flow shall be offered from FE2 to FE4 only if FE1 is in another TETRA system.

DEFINE-USER shall contain the SS-PC information elements listed in table 10.

Table 10: DEFINE-USER PDU contents

Element	Length	Type	C/O/M	Value	Remark
SS-type	6	1	M		:= PC := 011011 ₂
Action type	4	1	M		:= distribution := 0010 ₂
Defined subscriber type	4	1	M		
Defined subscriber number	48	1	C		(note)
Number of basic service definitions	3	1	M		
Number of basic services	3	1	C		(note)
Basic service(s)	3	1	C		(note)
High priority value	4	1	C		
Low priority value	4	1	C		
Acknowledgement from user A(s)	1	1	M	0	Acknowledgement requested
				1	Acknowledgement not requested

NOTE: Element shall be repeatable and it shall appear at least once.

6.4.4 DEFINE-USER-ACK

DEFINE-USER-ACK information flow shall be offered from FE1 to FE2. The flow shall be offered from FE1 to FE4 only if FE1 is in another TETRA system. FE1 shall only send the information flow if the acknowledgement was requested from it.

The result for definition shall be valid for all the defined subscriber numbers listed in the primitive.

NOTE: If the acknowledgements are different for different "defined subscriber numbers" FE1 shall send several DEFINE-USER-ACKs to FE2.

DEFINE-USER-ACK shall contain the SS-PC information elements listed in table 11.

Table 11: DEFINE-USER-ACK PDU contents

Element	Length	Type	C/O/M	Value	Remark
SS-type	6	1	M		:= PC := 011011 ₂
Action type	4	1	M		:= distribution := 0010 ₂
Defined subscriber type	4	1	M		
Defined subscriber number	48	1	C		(note)
Result for definition	3	1	M		
NOTE: Element shall be repeatable and it shall appear at least once.					

6.4.5 INTERROGATE

INTERROGATE information flow shall be offered from FE3/FE1 to FE2. The flow shall be offered from FE3/FE1 to FE4 only if FE3/FE1 is in another TETRA system.

INTERROGATE shall contain the SS-PC information elements listed in table 12.

Table 12: INTERROGATE PDU contents

Element	Length	Type	C/O/M	Value	Remark
SS-type	6	1	M		:= PC := 011011 ₂
Action type	4	1	M		:= interrogation := 0011 ₂
Interrogated subscriber type	4	1	M		
Interrogated subscriber number	48	1	C		(note)
NOTE: Element shall appear at least once.					

6.4.6 INTERROGATE-ACK

INTERROGATE-ACK information flow is offered from FE2 to FE3/FE1. The flow is offered from FE2 to FE4 only if FE3/FE1 in another TETRA system.

NOTE: If definitions/responses are different for different "interrogated subscriber numbers" FE2 shall send several INTERROGATE-ACKs to FE3/FE1.

INTERROGATE-ACK shall contain the SS-PC information elements listed in table 13.

Table 13: INTERROGATE-ACK PDU contents

Element	Length	Type	C/O/M	Value	Remark
SS-type	6	1	M		:= PC := 011011 ₂
Action type	4	1	M		:= interrogation := 0011 ₂
Interrogated subscriber type	4	1	M		
Interrogated subscriber number	48	1	C		(note 1)
Result for interrogation	3	1	M		
Activated/deactivated	1	1	M	0	activated
				1	deactivated
Number of basic service definitions	3	1	C		(note 2)
Number of basic services	3	1	C		(note 1), (note 2)
Basic service(s)	3	1	C		(note 1), (note 2)
High priority value	4	1	C		(note 2)
Low priority value	4	1	C		(note 2)
Delivered to user A(s) (note 2)	1	1	M	0	To be delivered
				1	Not to be delivered
Acknowledgement from user A(s)	1	1	M	0	Acknowledgement requested
(note 2)				1	Acknowledgement not requested
NOTE 1:	Element shall be repeatable and it shall appear at least once.				
NOTE 2:	The elements following the element "result for interrogation" can be present only if the result is "accepted", "accepted but definition request to one or more user As could not be reached" or "accepted, but one or more user As could not accept the request/accepted, but one or more user As where not reached".				

6.4.7 PDU descriptions for the invocation and operation of circuit mode basic service

6.4.7.1 D-CONNECT

D-CONNECT PDU shall be sent from FE2 to FE1. If FE1 is in system 2 the flow shall be sent from FE2 to FE4 and then from FE4 to FE1.

D-CONNECT PDU shall contain the elements defined in ETS 300 392-2 [1], clause 14 . The call element coding is described in subclause 6.6.

6.4.7.2 D-SETUP

D-SETUP information flow shall be sent from FE2 to FE5. If FE5 is in system 2 the flow shall be sent from FE2 to FE4 and then from FE4 to FE5.

D-SETUP PDU shall contain the elements defined in ETS 300 392-2 [1], clause 14 . The call priority element coding is described in subclause 6.6.

6.4.7.3 U-SETUP

U-SETUP information flow shall be sent from FE1 to FE2. If FE1 is in system 2 the flow shall be sent from FE1 to FE4 and then from FE2 to FE4.

U-SETUP PDU shall contain the elements defined in ETS 300 392-2 [1], clause 14 . The call priority element coding is described in subclause 6.6.

6.4.8 PDU descriptions for the invocation and operation of connection-oriented packet mode data service

SS-PC shall be applicable to connection-oriented packet mode data service. The SS-PC invocation and operation shall be conveyed in any connection-oriented packet data service packet containing the "priority" element as part of the QoS element, e.g. CALL REQUEST, INCOMING CALL, CALL ACCEPTED, CALL CONNECTED and CLEAR REQUEST.

The applied priority element values are within the range 0 to 14. 14 should be considered as emergency value in TETRA systems.

See ISO 8208 [5] for the encoding rules for connection-oriented packet mode data packets and priority element.

6.5 Element coding

6.5.1 Action type

Action type shall indicate the type of the action as described in table 14.

NOTE: Activation is used for PDUs used with SS-PC definition and acknowledgement of definition to user B (DEFINE-USER, DEFINE-USER-ACK).

Table 14: Action type contents

Element	Length	Value	Remark
Action type	4	0000 ₂	SS service not supported
		0001 ₂	definition
		0010 ₂	distribution
		0011 ₂	interrogation
		0100 ₂	cancellation
		0101 ₂	invocation
		0110 ₂	information
		0111 ₂	operation
		1000 ₂	deletion
		1001 ₂	reserved
		...	etc.
		1111 ₂	reserved

6.5.2 Basic service(s)

Basic service(s) shall indicate the basic service(s) to which the following high and low priority values are defined. Basic service type(s) element is described in table 15.

The applicable basic services should comprise of:

- circuit mode speech;
- circuit mode data; and
- connection-oriented packet mode data.

Table 15: Basic service type(s) contents

Element	Length	Value	Remarks
Basic service(s)	3	000 ₂	all applicable basic services
		001 ₂	circuit mode speech
		010 ₂	circuit mode data
		011 ₂	packet mode data (connection oriented)
		100 ₂	reserved
			etc.
		111 ₂	reserved

6.5.3 Defined Subscriber number

Subscriber number shall define a TETRA subscriber identity. Subscriber number element is described in table 16.

Table 16: Subscriber number contents

Element	Length	Value	Remark
SSI	24		See ETS 300 392-1 [3], clause 7.
MCC	10		See ETS 300 392-1 [3], clause 7.
MNC	14		See ETS 300 392-1 [3], clause 7.

6.5.4 Defined subscriber type

Defined subscriber type shall indicate if following subscriber number or numbers shall be one number, range of number or a list of these numbers. The element shall also indicate how many "defined subscriber number" elements are following. Defined subscriber type element is described in table 17.

Table 17: Defined subscriber type contents

Element	Length	Value	Remarks
Defined subscriber type	4	0000 ₂	Subscriber number, 1
		0001 ₂	Range of subscriber numbers, 2
		0010 ₂	List of subscriber numbers, 2
		0011 ₂	List of subscriber numbers, 3
		0100 ₂	List of subscriber numbers, 4
		0101 ₂	List of subscriber numbers, 5
		0110 ₂	List of subscriber numbers, 6
		0111 ₂	List of subscriber numbers, 7
		1000 ₂	List of subscriber numbers, 8
		1001 ₂	List of subscriber numbers, 9
		1010 ₂	List of subscriber numbers, 10
		1011 ₂	reserved
		...	etc.
1111 ₂	reserved		
NOTE:	The number in Remark column indicates how many subscriber number elements shall be present.		

6.5.5 High priority value (for circuit mode basic service)

High priority shall indicate the numeric value for the call priority for circuit mode basic service.

High priority value element is described in table 18.

Table 18: High priority value contents

Element	Length	Value	Remarks
High priority value	4	0000 ₂	0
		0001 ₂	1
		0010 ₂	2
		0011 ₂	3
		0100 ₂	4
		0101 ₂	5
		0110 ₂	6
		0111 ₂	7
		1000 ₂	8
		1001 ₂	9
		1010 ₂	10
		1011 ₂	11
		1100 ₂	- (pre-emptive; not used for SS-PC)
		...	etc.
1111 ₂	- (pre-emptive; not used for SS-PC)		

6.5.6 Interrogated subscriber number

As defined subscriber number.

6.5.7 Interrogated subscriber type

As defined subscriber type.

6.5.8 Low priority value (for circuit mode basic service)

See high priority value (for circuit mode basic service).

6.5.9 Number of basic service(s)

Basic service type shall indicate how many basic service elements are present and follow this element in the PDU. Basic service type(s) element is described in table 19.

Table 19: Basic service type(s) contents

Element	Length	Value	Remarks
Number of basic service(s)	3	000 ₂	1
		001 ₂	2
		010 ₂	3
		011 ₂	reserved.
		100 ₂	reserved.
		101 ₂	reserved.
		110 ₂	reserved.
		111 ₂	reserved.

6.5.10 Number of basic service definitions

Number of different basic service definitions shall indicate how many different basic service definitions are present in the SS-FACILITY element. One "different basic service" element refers to a combination of number of basic service(s), basic service(s), high priority value and low priority value. If the "number of basic service definitions" has e.g. the value 2, there are two different combinations of number of basic services, basic services, high priority value and low priority value. Each element shall be present at least once in one combination, and the elements shall always be in the same order: e.g. first all elements of combination₁ (number of basic services₁ + basic services₁ + high priority value₁ + low priority value₁) and then all elements of combination₂ (number of basic services₂ + basic services₂ + high priority value₂ + low priority value₂).

Number of basic service(s) element is described in table 20.

Table 20: Number of basic service(s) contents

Element	Length	Value	Remarks
Number of different basic service(s) definitions	3	000 ₂	1
		001 ₂	2
		010 ₂	3
		011 ₂	reserved.
		100 ₂	reserved.
		101 ₂	reserved.
		110 ₂	reserved.
		111 ₂	reserved.

6.5.11 Result for definition

Result for definition shall indicate whether the previously made definition request was successful or unsuccessful. Result for definition element is described in table 21.

Table 21: Result for definition contents

Element	Length	Value	Remark
Result for definition	3	000 ₂	accepted by SwMI or accepted by MS (Note 1)
		001 ₂	accepted but SS-PC priority values changed (Note 2)
		010 ₂	one or more user As could not accept the request/one or more user As where not reached (Note 2)
		011 ₂	request failed for any reason
		100 ₂	user not authorized
		101 ₂	unknown TETRA identity
		110 ₂	parameters not valid
		111 ₂	insufficient information
NOTE 1: "accepted by SwMI" can be applied only for DEFINE-ACK; "accepted by MS" can be applied only for DEFINE-USER-ACK.			
NOTE 2: The error code is applicable only to flows from FE2 (or FE4) to FE3.			

6.5.12 Result for interrogation

Result for interrogation shall indicate whether the previously made interrogation request was successful or unsuccessful. Result for interrogation element is described in table 22.

Table 22: Result for interrogation contents

Element	Length	Value	Remark
Result for interrogation	3	000 ₂	accepted
		001 ₂	accepted, but one or more user As could not accept the request/accepted, but one or more user As where not reached
		010 ₂	SS-PC not defined for the given identity
		011 ₂	request failed for any reason
		100 ₂	user not authorized
		101 ₂	unknown TETRA identity
		110 ₂	parameters not valid
		111 ₂	reserved

7 SS-PC FE behaviour

The figures contained in this clause are intended to illustrate typical SS-PC 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) defined in CCITT Recommendation Z.100 [8]. Notice, however, that due to simplicity there are deviations from syntactical rules.

The convention used in the figures below is that 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 PC 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.

FE1 refers to a block and FE_1 refers to a process in the figures below.

The invocation and operation of SS-PC is only shown for circuit mode basic service.

The invocation and operation of SS-PC for connection-oriented packet mode data is described in ISO 8208 [5], in ISO 8348 [6] and in ISO 8878 [7]. However, the general principles of SS-PC shall apply for connection-oriented packet mode data service to all parties and in case of resource allocation in connection set-up the given priority should be respected to determine the importance of the call.

7.1 Behaviour of FE1 (SS entity of user A)

7.1.1 Service interaction for FE1

Service interaction for FE1 is shown in figure 4.

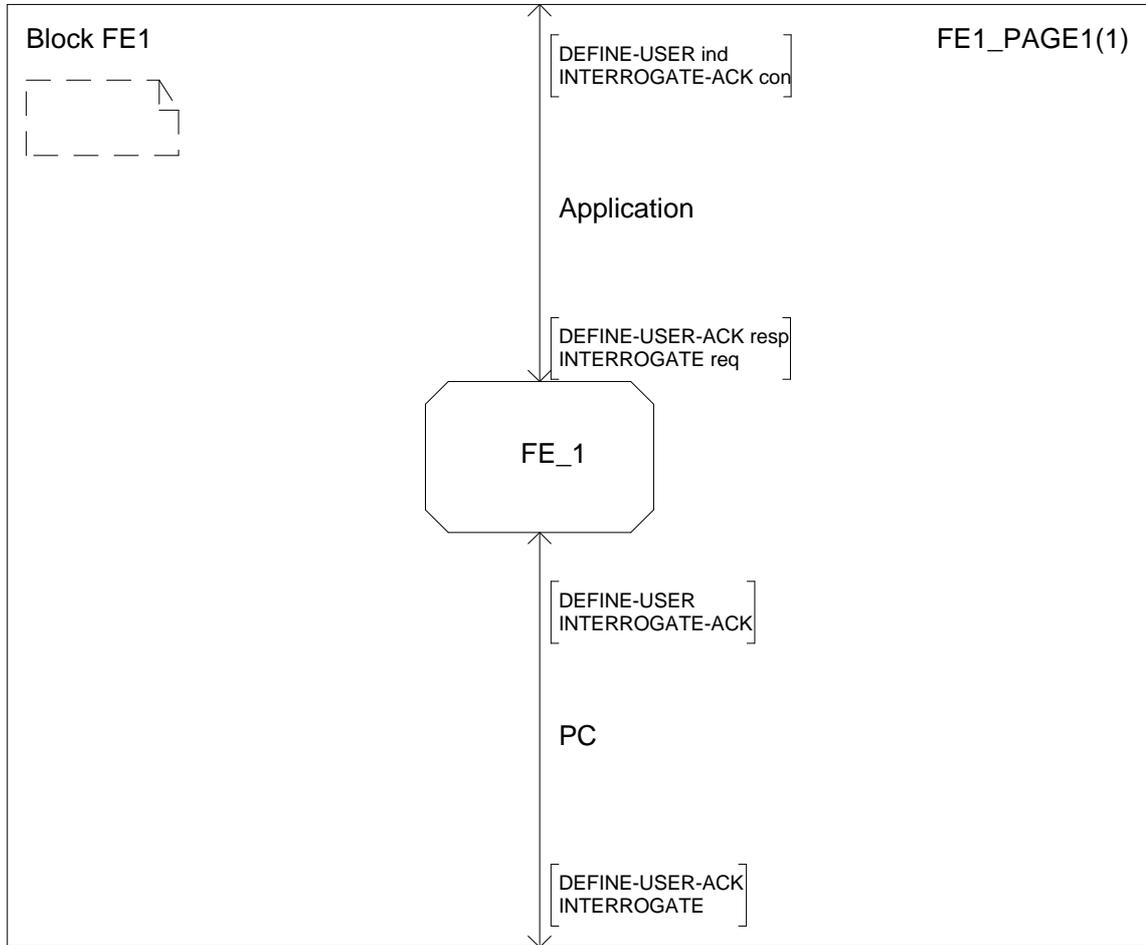


Figure 4: Service interaction for FE1

7.1.2 Process description for FE1

Process description of FE1 is shown in figure 5.

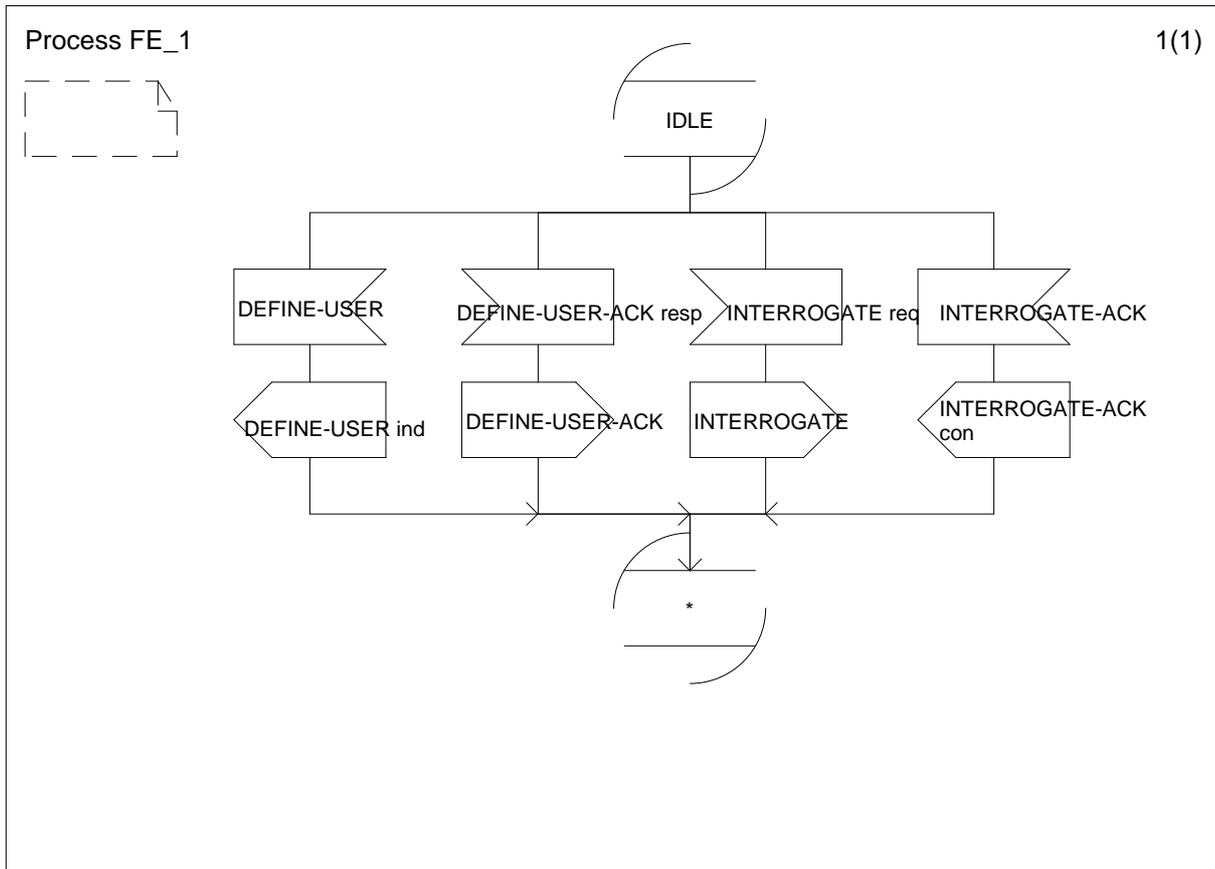


Figure 5: Process description for FE1

7.2 Behaviour of CCA to which FE1 is collocated

7.2.1 Service interaction for CCA to which FE1 is collocated

Service interaction for CCA to which FE1 is collocated is shown in figure 6.

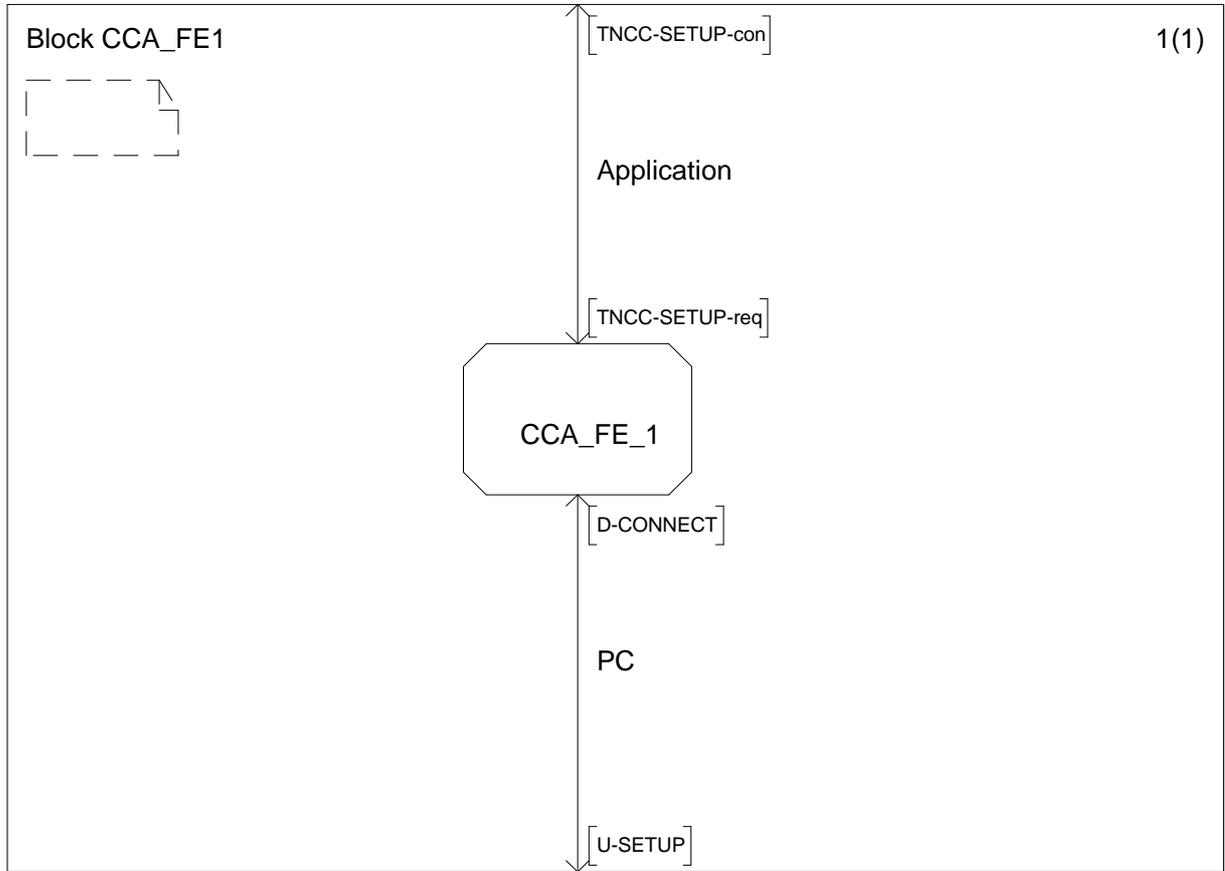


Figure 6: Service interaction for CCA to which FE1 is collocated

7.2.2 Process description for CCA to which FE1 is collocated

Process description for CCA to which FE1 is collocated is shown in figure 7.

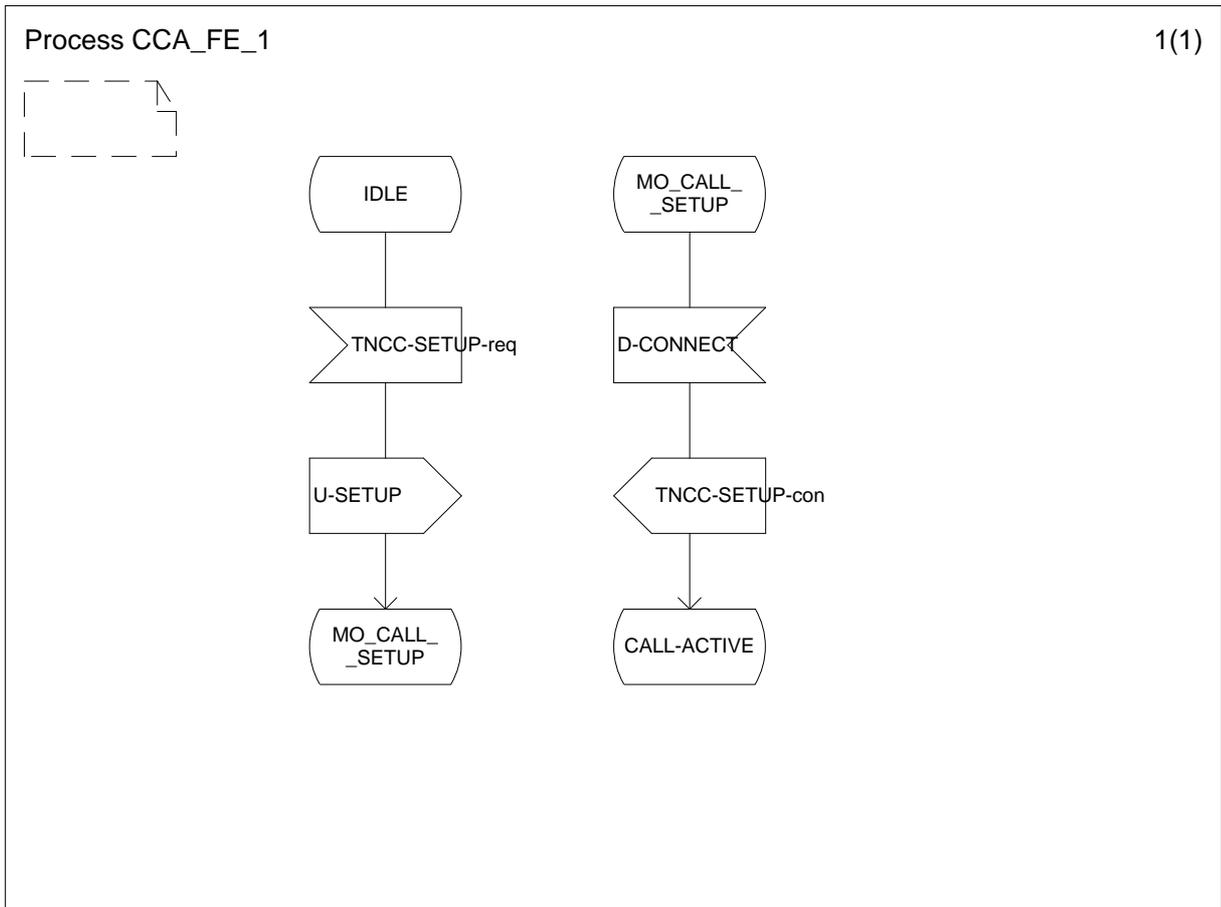


Figure 7: Process description for CCA to which FE1 is collocated

7.3 Behaviour of FE2 (SS entity of SwMI in system 1)

7.3.1 Service interaction for FE2

Service interaction for FE1 is shown in figure 8.

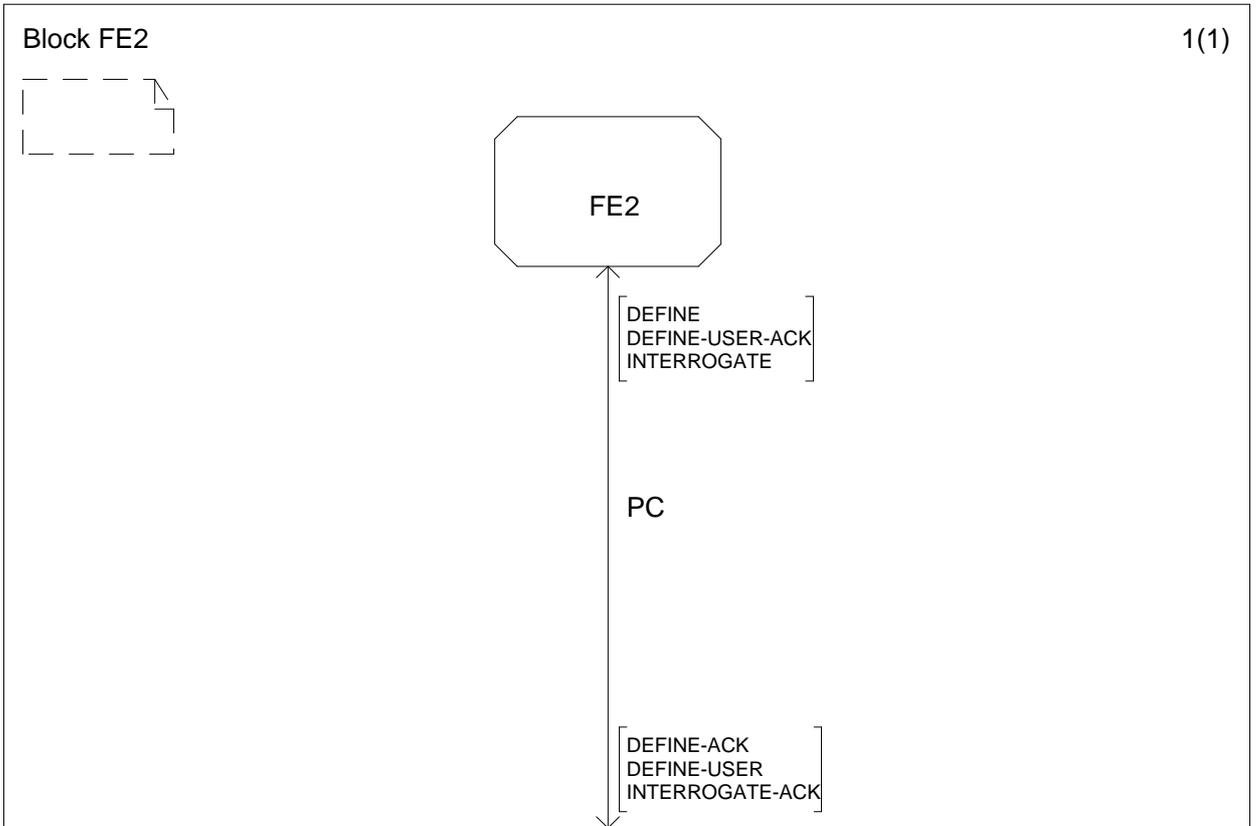


Figure 8: Service interaction for FE2.

7.3.2 Process description for FE2

Process descriptions for FE2 state IDLE and WAIT-FOR-ACK is shown in figures 9 and 10.

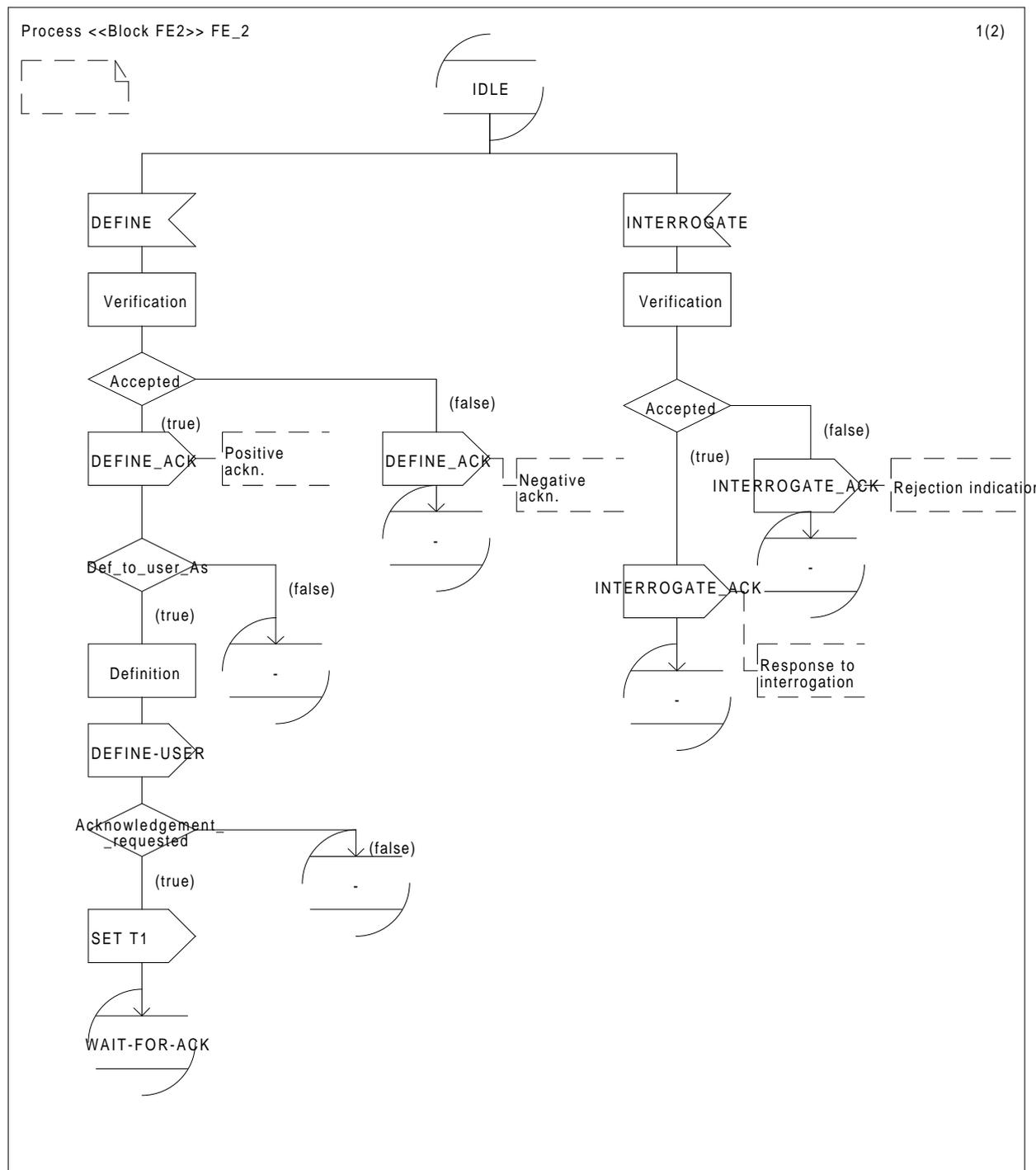


Figure 9: Process description for FE2 state IDLE

Process FE2_2

2(1)

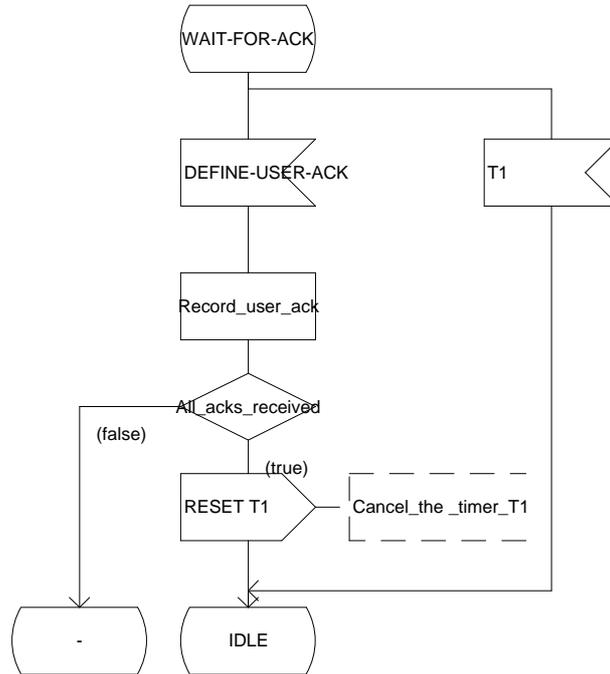


Figure 10: Process description for FE2 state WAIT-FOR-ACK

7.4 Behaviour of CC to which FE2 is collocated

7.4.1 Service interaction for CC to which FE2 is collocated

Service interaction for CC to which FE2 is collocated is shown in figure 11.

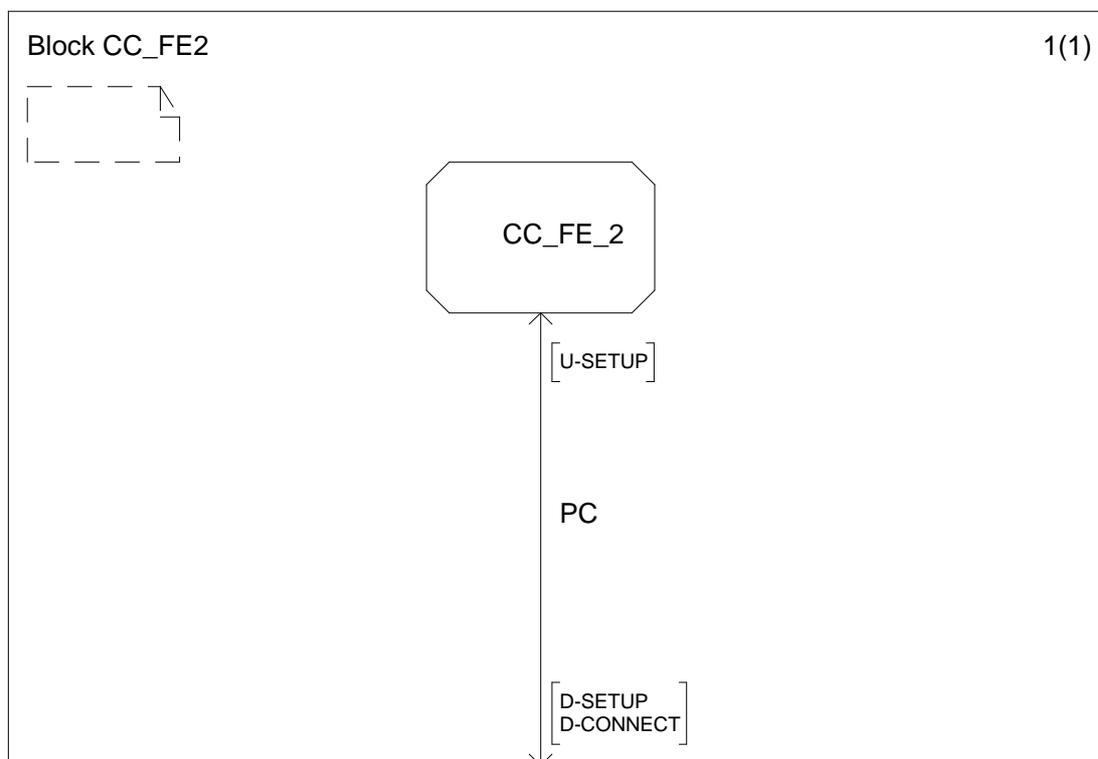


Figure 11: Service interaction for CC to which FE2 is collocated

7.4.2 Process description for CC to which FE2 is collocated

Process description for CC to which FE2 is collocated is shown in figure 12.

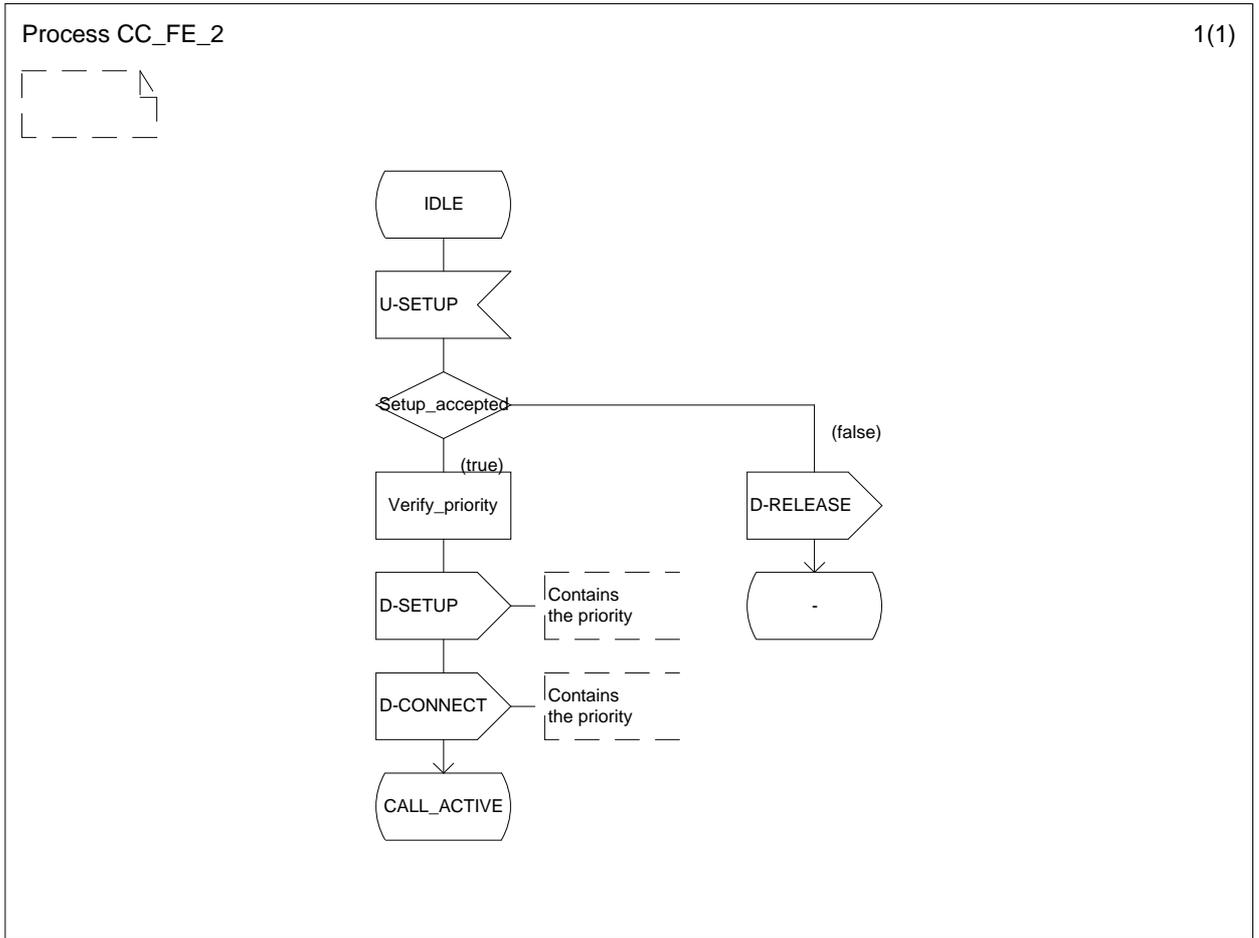


Figure 12: Process description for CC to which FE2 is collocated

7.5 Behaviour of FE3 (SS entity of authorized user)

7.5.1 Service interaction for FE3

Service interaction for FE3 is shown in figure 13.

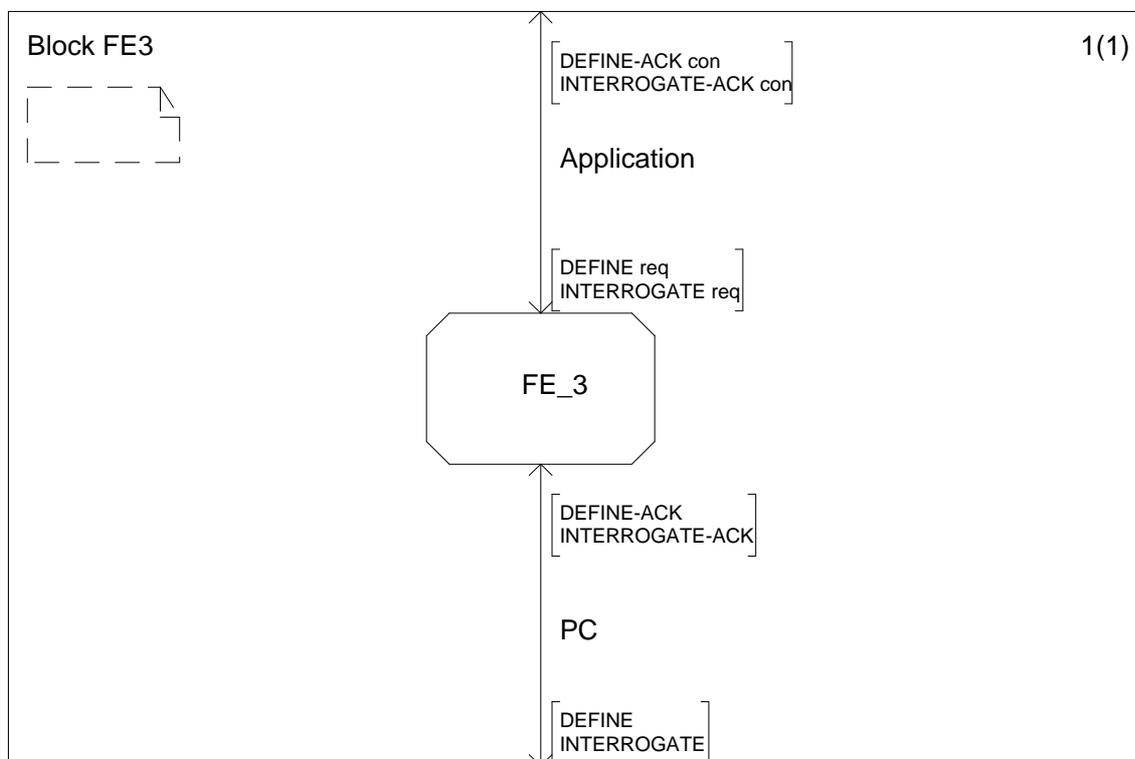


Figure 13: Service interaction for FE3

7.5.2 Process description for FE3

Process description of FE3 is shown in figure 14.

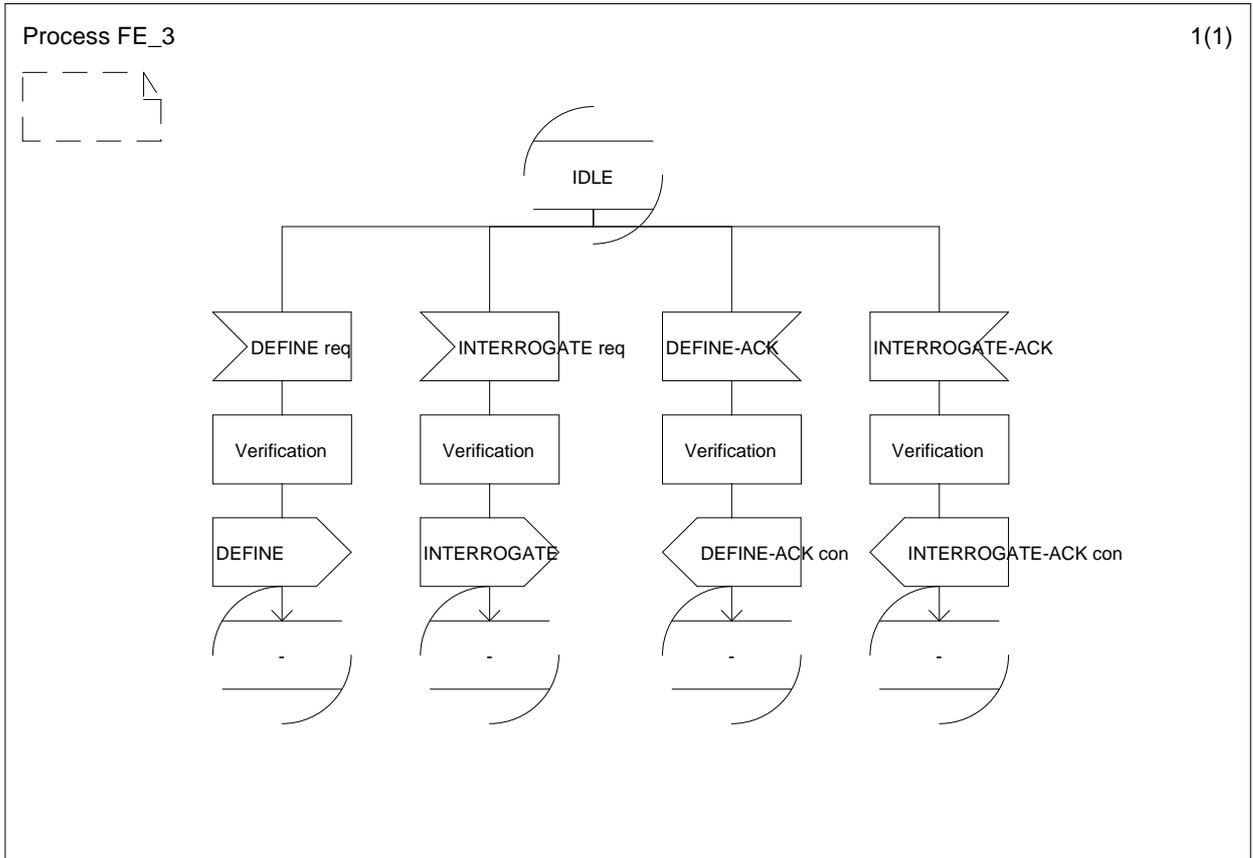


Figure 14: Process description for FE3

7.6 Behaviour of FE4 (SS entity of SwMI in system 2)

7.6.1 Service interaction for FE4

Service interaction for FE4 is shown in figure 15.

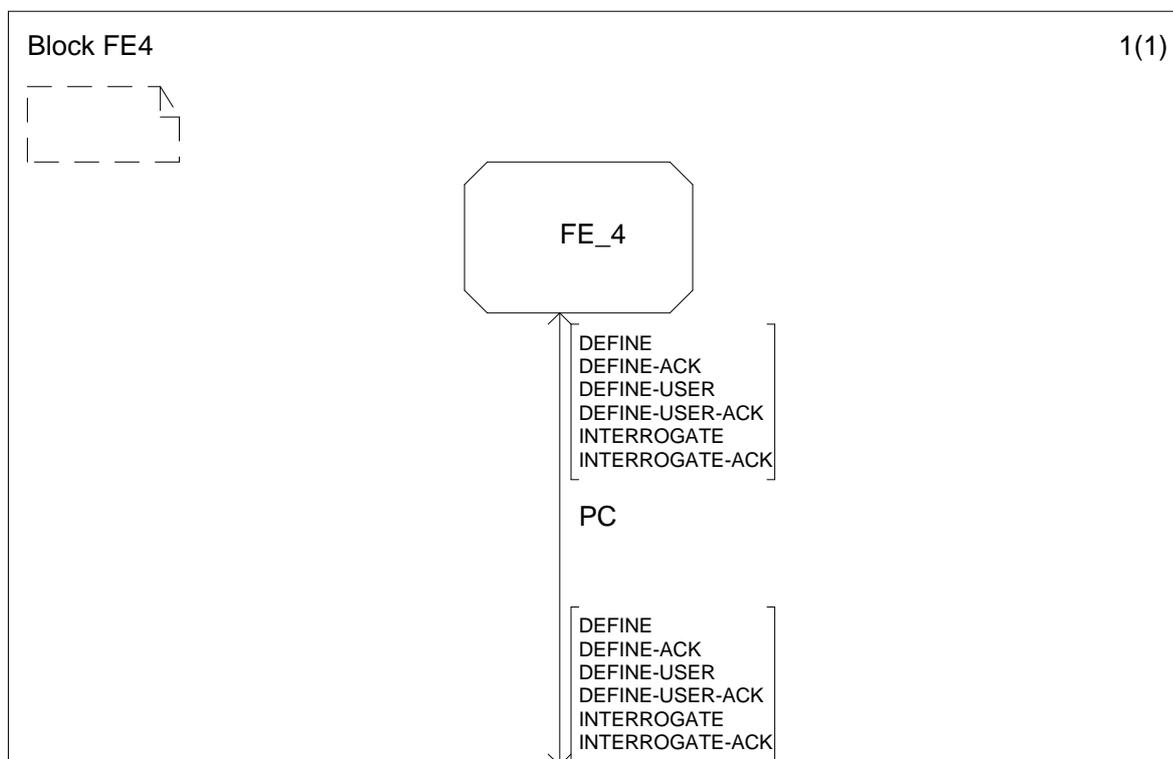


Figure 15: Service interaction for FE4

7.6.2 Process description for FE4

Process description for FE4 is shown in figure 16.

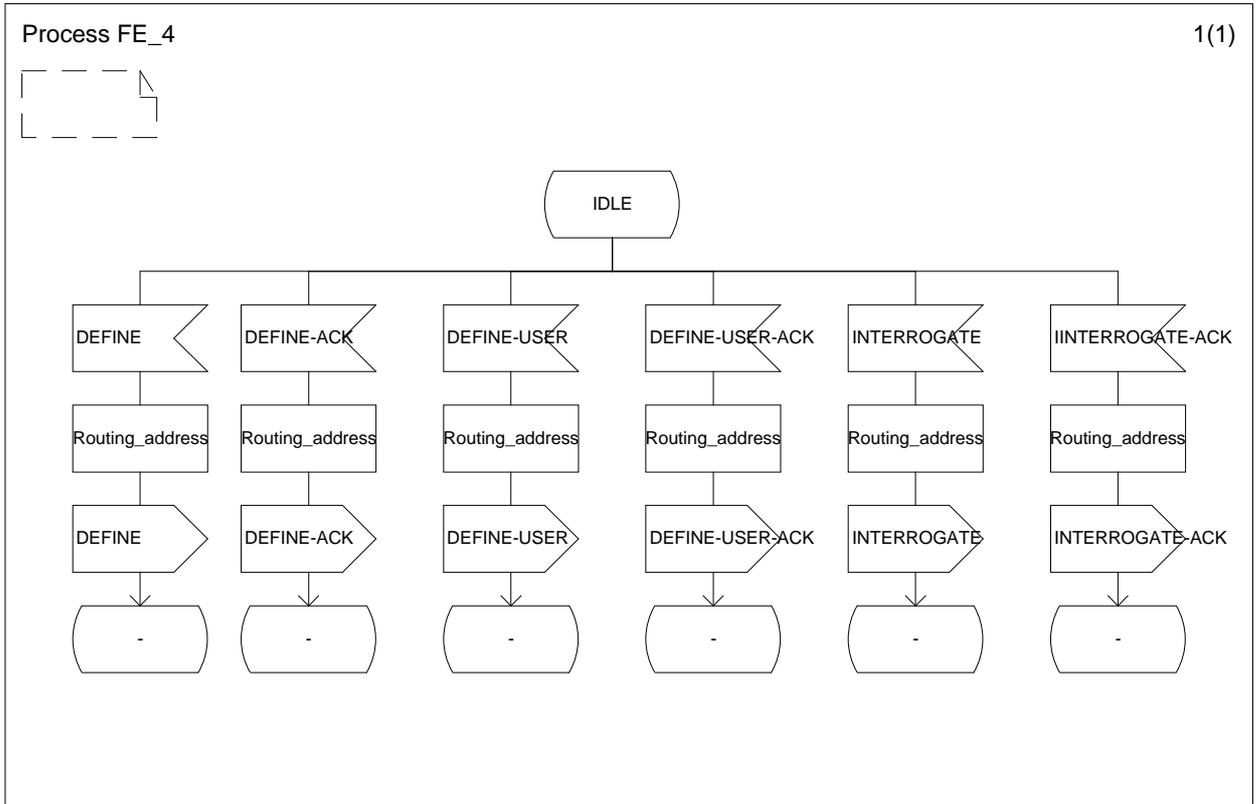


Figure 16: Process description for FE4

7.7 Behaviour of CCA to which FE5 is collocated

7.7.1 Service interaction for CCA to which FE5 is collocated

Service interaction for CCA to which FE5 is collocated is shown in figure 17.

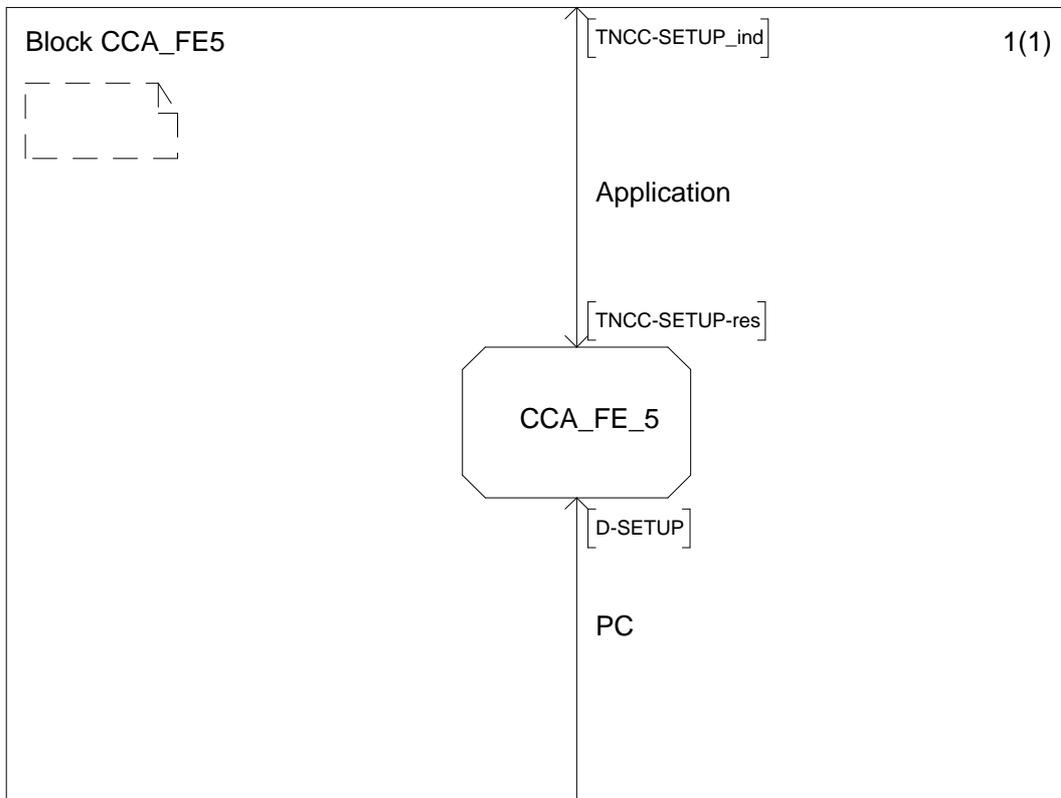


Figure 17: Service interaction for CCA to which FE5 is collocated

7.7.2 Process description for CCA to which FE5 is collocated

Process description for CCA to which FE5 is collocated is shown in figure 18.

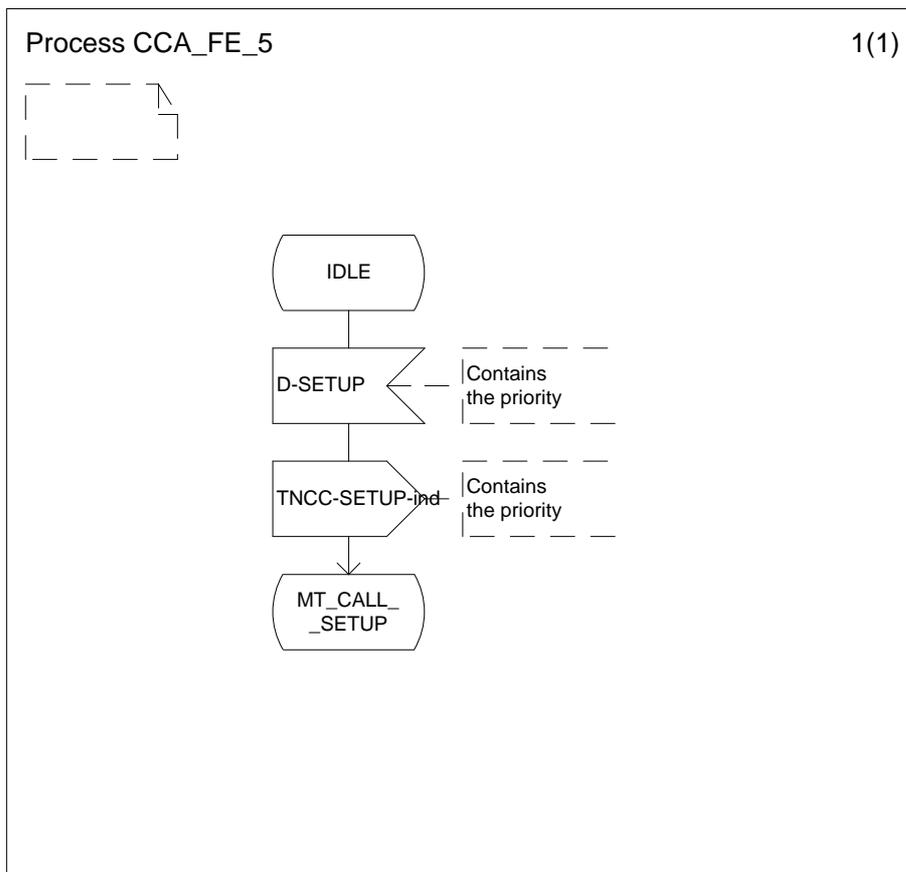


Figure 18: Process description for CC to which FE5 is collocated

7.8 Inter-working considerations

In order to enable the SS-PC to extend to several TETRA systems over the ISI, the FEs (FE2s and FE4s) in different TETRA systems shall be able to send and receive SS information flows over the ISI.

Annex A (informative): Mapping of SS-PC priorities received from application to priorities in basic service PDUs (for MS/LS)

The capability to save SS-PC definitions in MS/LS is an optional feature within MS/LS and the recommendations given below are applicable only for user A (calling party), if this optional feature is supported in the MS/LS of user A.

FE1 should pass the SS-PC definition requests to application in MS/LS. Application should save the definition in the database in MS/LS. The application should always accept the definition if the definition is made to the ITSI(s) related to the MS/LS or to any GTSI defined in the MS/LS. After saving the definition, FE1 should acknowledge the SS-PC request, if this was requested.

When the SS-PC service is invoked to a call, the application should give the correct SS-PC priority value to layer 3. The correct sub-entity within layer 3 should then include the priority into the correct basic service PDU. When SwMI (FE2 or FE4) then receives the requested priority, it should check it and if needed, SwMI can change the priority level (value) for the basic service. If the basic service extends to several systems, the applied call priority can be different in different TETRA systems as each system can invoke the priority level independently. The invoked priority value is given in the downlink messages to FE5(s), and to FE1 if applicable. FE5 (and FE1) should then pass the priority to application. Application should then accept the received priority and act upon it.

A.1 Mapping of SS-PC priorities for circuit mode speech and data

FE1 should map the value of "call priority" received in the basic service primitive from application to circuit mode speech call PDUs. Application should allow the user to only request values, that are allowed for the user. If the user is requesting a value that is not allowed for the user, application should replace the value with a correct value and indicate this to the user or bar the service request. When CC receives the call priority value from application, it should not need to check the value. CC should only add the requested value to the basic service PDU.

SS-PC is only applicable to the non-pre-emptive priorities.

A.2 Mapping of SS-PC priorities for connection-oriented packet mode data service

FE1 should map the value of "priority" received in the basic service primitive from application to connection-oriented packet mode data PDUs. Application should allow the user to only request values, that are allowed for the user. If the user is requesting a value that is not allowed for the user, application should replace the value with a correct value and indicate this to the user or bar the service request. When CONP receives the call priority value from application, it should not need to check the value. CONP should only add the requested value to the basic service PDU.

SS-PC is only applicable to the non-pre-emptive priorities.

History

Document history	
August 1996	Public Enquiry PE 111: 1996-08-05 to 1996-11-29