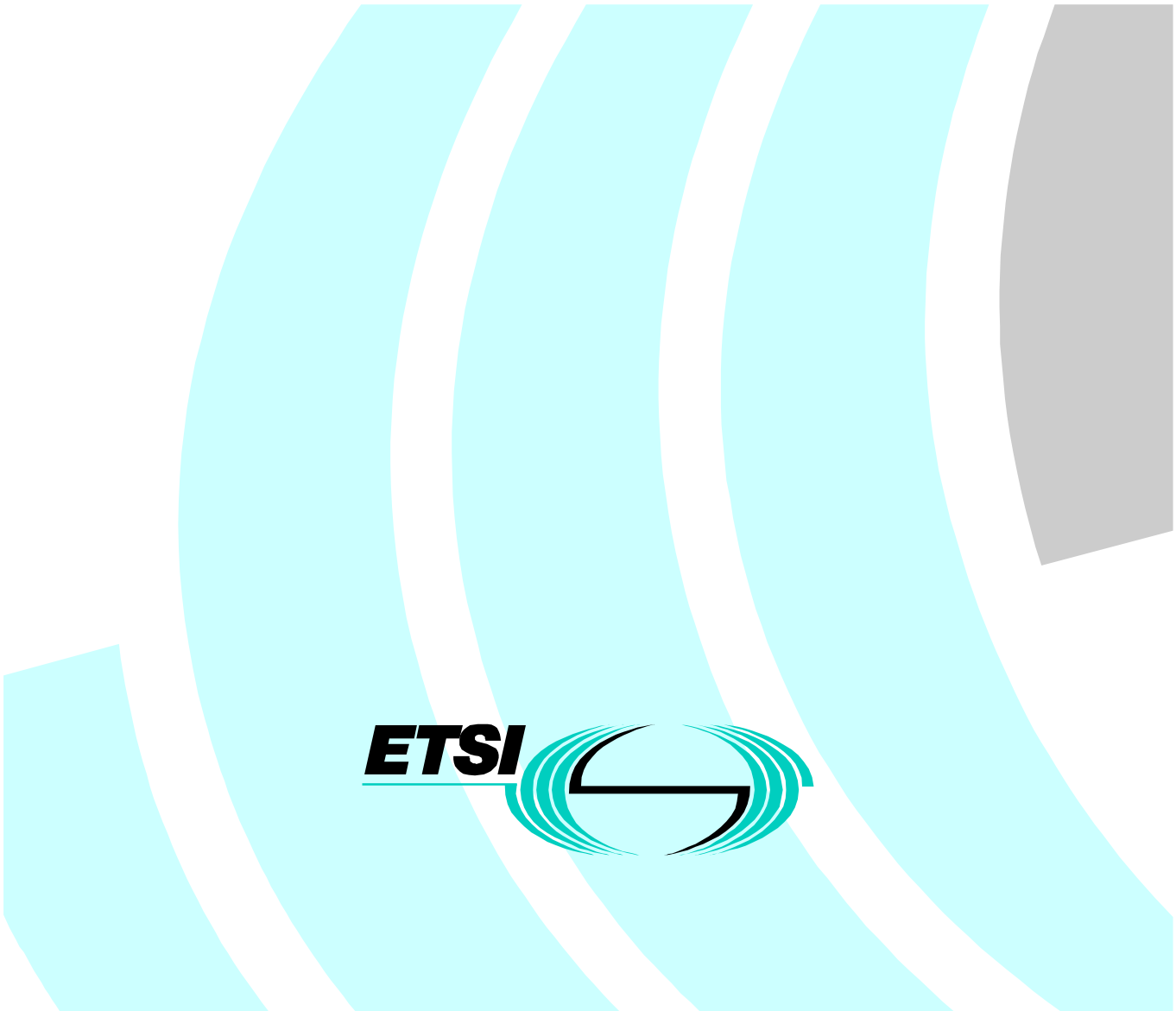
Final draft ETSI EN 300 392-11-10 V1.1.1 (2001-03)

European Standard (Telecommunications series)

Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 11: Supplementary services stage 2; Sub-part 10: Priority Call (PC)



Reference
DEN/TETRA-03A-11-10

Keywords
radio, tetra

ETSI

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Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Project Terrestrial Trunked Radio (TETRA), and is now submitted for the Vote phase of the ETSI standards Two-step Approval Procedure.

The present document had been submitted to Public Enquiry as ETS 300 392-11-10. During the processing for Vote, it was converted into an EN.

The present document is part 11 of a multi-part deliverable covering Voice plus Data (V+D), as identified below:

Part 1: "General network design";

Part 2: "Air Interface (AI)";

Part 3: "Interworking at the Inter-System Interface (ISI)";

Part 4: "Gateways basic operation";

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

Part 6: "Line connected Stations (LS)";

Part 7: "Security";

Part 9: "General requirements for supplementary services";

Part 10: "Supplementary services stage 1";

Part 11: "Supplementary services stage 2";

Part 12: "Supplementary services stage 3";

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

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

TS 100 392-15: "TETRA frequency bands, duplex spacings and channel numbering".

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

1 Scope

The present document defines the stage 2 specifications of the Supplementary Service Priority Call (SS-PC) for the Terrestrial Trunked RAdio (TETRA).

The SS-PC is defined to enable a user to have preferential access to the network resources in a TETRA system in times of congestion. The SS-PC applies for the basic services: circuit mode calls (speech or data). The SS-PC specifies the definition, activation, deactivation and interrogation for the usage of low and high call priorities in the TETRA system. The SS-PC operations are defined for Switching and Management Infrastructure (SwMI), for the Mobile Station (MS) and for the Line Station (LS). SS-PC is defined for subscribers of one TETRA system, but the subscribers may be located in several TETRA systems and the information flows may be delivered over the Inter System Interface (ISI). SS-PC may 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, Man-Machine Interface (MMI) and charging principles are outside of the scope of the present document.

Stage 2 describes the functional capabilities of the supplementary service introduced in stage 1 description. Stage 2 identifies the functional capabilities for the management and operation of the service in the SwMI, in the MS and in the LS. Stage 2 describes also the information flows exchanged between these entities and the flows sent over the ISI.

NOTE: The stage 2 description is followed by the stage 3 description, which specifies the encoding rules for the information flows and process behaviour for the different entities in the SwMI, the MS and LS.

Aspects relating to all supplementary services are detailed in ETS 300 392-9 [2].

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

[1] ETSI EN 300 392-2 (V2.3.1): "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 2: Air Interface (AI)".

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

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

[4] ETSI ETS 300 392-10-10: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 10: Priority Call (PC)".

[5] ETSI EN 300 392-12-10: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 12: Supplementary services stage 3; Sub-part 10: Priority Call (PC)".

[6] ISO/IEC 11574 (2000): "Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Circuit-mode 64 kbit/s bearer services - Service description, functional capabilities and information flows".

[7] ETSI ETS 300 392-12-16: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 12: Supplementary services stage 3; Sub-part 16: Pre-emptive Priority Call (PPC)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

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

call controlling SwMI: in an individual call the call originating SwMI and in a group call the home SwMI of the group

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

user A: calling party, the party that invokes or generates invocation of SS-PC

user B: called party in a call for which SS-PC is operated

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

CC	basic service Call Control functional entity
CCA	basic service Call Control functional entity Agent

NOTE: CC and CCA are applied as defined in ISO/IEC 11574 [6].

FE	Functional Entity
GTSI	Group TETRA Subscriber Identity
ISDN	Integrated Services Digital Network
ISI	Inter-System Interface
ITSI	Individual TETRA Subscriber Identity
SS-PC	Supplementary Service Priority Call
SS-PPC	Supplementary Service Pre-emptive Priority Call
SDL	Specification and Description Language
SS	Supplementary Service
SwMI	Switching and Management Infrastructure
TETRA	Terrestrial Trunked Radio

4 Functional model

4.1 Functional model description

The functional model describes the functional characteristics of the Functional Entities (FEs) involved in the management and operation of SS-PC.

The functional model shall comprise the following FEs:

- FE1 user A's (calling party's) FE;
- FE21 SS-PC FE in home SwMI or controlling SwMI;

NOTE 1: During definition, activation, deactivation and interrogation request, FE21 may either be user A's home SwMI or a group home SwMI.

During invocation and operation, FE21 will be the controlling SwMI of the priority call that has been initiated.

- FE3 authorized user's FE;

- FE5 user B's (called party's) FE;

NOTE 2: Called party in a call in which SS-PC is operated.

- FE25 SS-PC FE in user B's SwMI;

CC Call Control FE in SwMI.

CCA Call Control Agent FE in MS/LS.

The following relationships shall exist between these FEs:

- ra between FE1 and FE21/FE25;
- rb between FE21 and FE25;
- rc between FE21 and FE3;
- rd between FE21/FE25 and FE5.

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

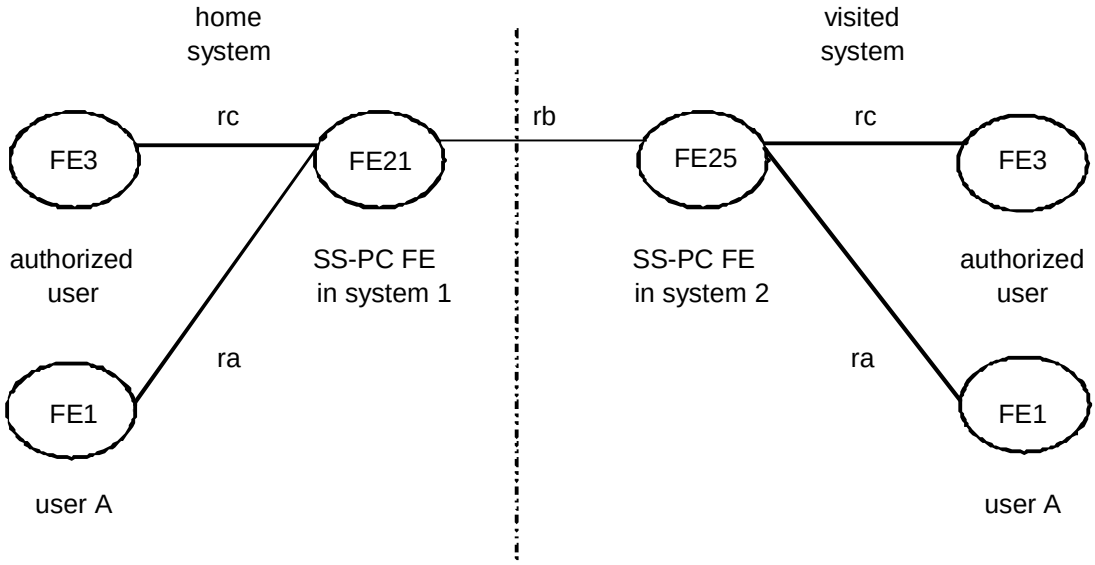


Figure 1: The relations and the functional entities of the management part of SS-PC

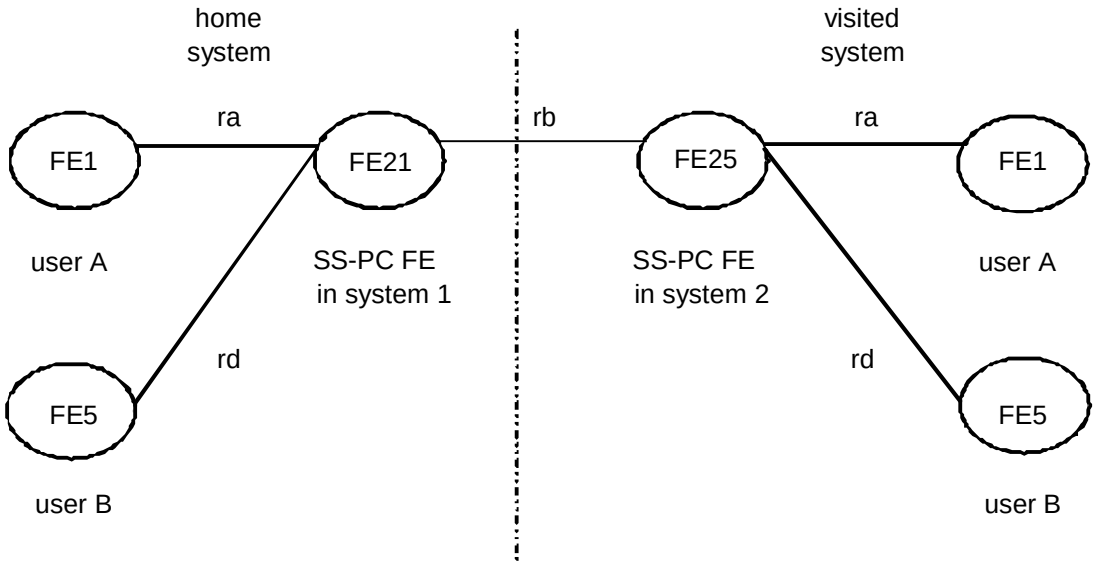


Figure 2: The relations and functional entities of the operational part of SS-PC

4.2 Description of functional entities

4.2.1 User A's functional entity, FE1

The functional tasks of FE1 for definition and interrogation shall be the following:

- as an option, the MS/LS may support reception of SS-PC definition from FE21. Upon acceptance, FE1 shall pass the SS-PC definition request, to the user application and acknowledge the SS-PC definition, if FE21 has requested this;
- as an option, the MS/LS may supports SS-PC interrogation, FE1 shall pass the SS-PC interrogation request to FE21, when the user application issues it. Upon reception of the interrogation response from FE21, FE1 shall pass it to the user application.

The functional tasks for operation of FE1 for a priority individual or group call request shall be as follows:

- upon reception of the SS-PC invocation from the user application within a call set-up, FE1 shall send the SS-PC invocation to the SwMI (FE21) with the call set-up;
- upon reception of a SS-PC confirmation from FE21, FE1 shall pass the SS-PC confirmation to the user application;
- when migrated into a visited system the user application shall use "Priority not defined" in the call setup until a definition is provided e.g. by default or downloaded.

NOTE: It is outside of the present document how default values for the home system are allocated.

4.2.2 SS-PC functional entity in the individual or group home SwMI, FE21

The functional tasks of FE21 for definition, activation, deactivation and interrogation shall be the following:

- as an option, FE21 supports SS-PC definition, FE21 shall verify these request when received from FE3 and if found valid, save this information and acknowledge it to FE3;
- as an option, FE21 supports SS-PC activation or deactivation, FE21 shall verify these request when received from FE3 and if found valid, save this information and acknowledge it to FE3;
- as an option, if FE3 requested downloading of SS-PC definition to FE1(s), FE21 shall then send the corresponding requests to the concerned FE1s and may receive their acknowledgements;
- as an option, at the reception of an SS-PC interrogation request from either FE3 or FE1, FE21 should verify the request and send the response to FE3 or FE1. If FE21 does not support interrogation, an error indication shall be sent in response to the requesting entity.

4.2.3 SS-PC FE in the controlling SwMI, FE21

The functional tasks for operation of FE21 for a priority individual or group call shall be as follows:

- when FE21 receives a call set-up request with the SS-PC invocation, FE21 shall verify the received priority and change it, if needed;
- FE21 shall send the SS-PC call set-up, with its priority value to the called party/parties (FE5);
- if the SS-PC call attempt has been successful, FE21 should send the SS-PC priority to the calling party.

4.2.4 SS-PC FE in called user visited SwMI or participating SwMI, FE25

The are no functional tasks of FE25 for definition, activation, deactivation and interrogation.

NOTE: If authorised user (FE3) is migrated to a visited SwMI and makes a definition or interrogation request that applies to a subscriber identity belonging to another system, FE25 shall forward the request to FE21. When FE25 receives a response to the request from FE21, it shall send the response to FE3, refer to ETS 300 392-9 [2] for further details.

The functional tasks for operation of FE25 shall exist for both individual and group calls. These tasks shall then be the following:

- when FE25 receives a call set-up indication from FE21 with the SS-PC invocation, FE25 shall not change the received priority value. However, it may apply a different internal priority value for allocating its own resources for this call. FE25 shall send the SS-PC call set-up, with the priority value received from FE21, to the called party/parties.

4.2.5 Authorized user's FE, FE3

If the authorized user supports the optional definition and/or activation/deactivation and/or interrogation procedures, FE3 functional tasks shall be the following:

- upon reception of the SS-PC definition, activation, deactivation or interrogation requests from the user application, FE3 shall send them to FE21;

- upon reception of the SS-PC definition, activation, deactivation and interrogation responses from FE21, FE3 shall pass them to the user application.

4.2.6 User B's (called party) FE, FE5

The functional tasks of FE5 shall be the following:

- upon reception of an incoming SS-PC call attempt, FE5 shall indicate the SS-PC priority of the call to the user application.

4.3 Relationship of functional model to basic call functional model

In the case of SS-PC invocation, FE1 shall be collocated with CCA.

In the case of SS-PC invocation and operation, FE2x shall be collocated with CC.

In the case of SS-PC operation, FE5 shall be collocated with CCA.

Figure 3 shows the different relationships that may exist between FEs and CC/CCA.

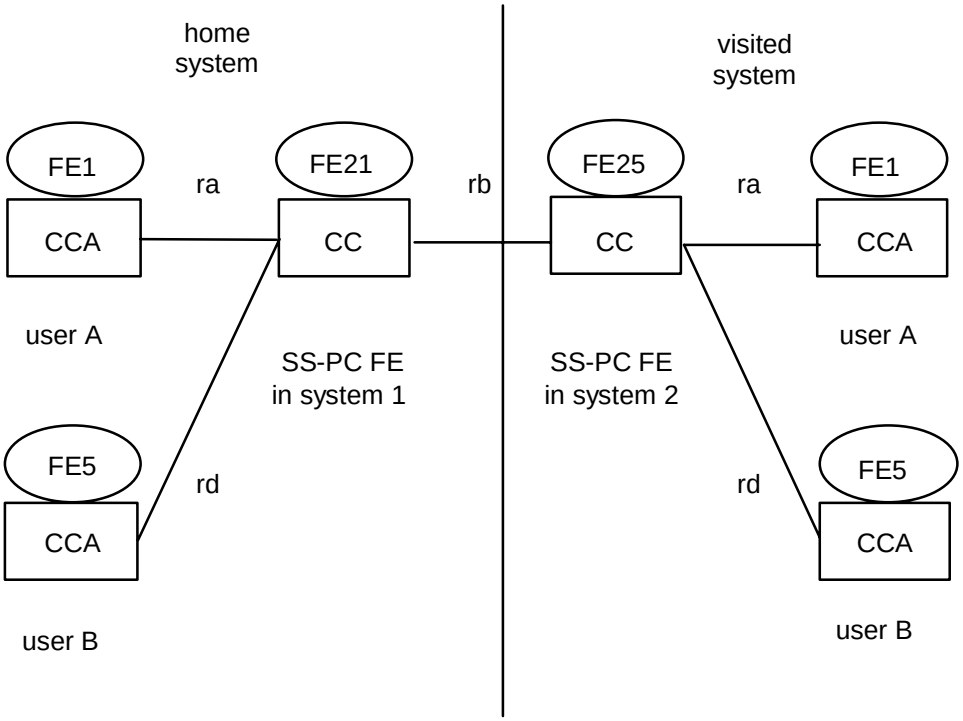


Figure 3: The relationships between the basic service and SS-PC functional entities

5 Information flows

5.1 Definition of information flows

In the tables listing the elements in the information flows, the column header "Type" indicates which of the service elements are Mandatory (M), Conditional (C) or Optional (O). If type is conditional, the conditions are stated.

NOTE: It is possible that there is not a one-to-one mapping between a service element and Protocol Data Units (PDUs) or primitive elements described in ETS 300 392-12-16 [7].

5.1.1 Definition

The authorized user may define SS-PC to be saved in a TETRA system. The definition may be made to a single individual subscriber or to a range or list of individual subscribers. The definition may also be made to one group or to a range or list of groups.

When priority values have been defined for an individual TETRA user, the priority value shall apply for individual calls initiated by the user. When priority values are defined for a group, the priority value shall apply for calls to this group made by group members. For calls initiated by none group members, the SwMI shall determine whether the defined priority for the group shall apply to the call or whether some other default value shall be used, i.e. calling users defined priority value.

The priority values can be defined separately to different basic services or a common value can be defined to these services. The priority shall be defined as the highest value for the high priority calls and as the highest value for the low priority calls. However, it is not necessary to define both of these values in which case the missing high priority shall be the same as the low priority value or the missing low priority shall be the lowest possible value.

The authorized user, that is making the definition, shall indicate if the definition should be sent to user A(s) subscriber unit(s). If the definition is made to a group number, the definition shall be sent to all members of the group, if sending of definitions to the MS/LS unit(s) was requested. If the definition is sent to the user A's subscriber unit, an acknowledgement may be requested from it. The sending of the SS-PC definition to user A is on optional feature for FE2x; FE1 may recognise the information flow. Assign indication is an optional feature for the MS.

NOTE: As an operator option, the definition may be made to SwMI only, so that the SwMI knows and applies the allowed priority to a call independently of a user selection.

A new definition shall override an older definition.

Relative priority mechanism shall be used between SwMIs for SS-PC operation over ISI for resource allocations.

5.1.1.1 DEFINE

DEFINE information flow shall be used to define the call priority value(s) for TETRA identities.

The information flow is for the relationship rc and from FE3 to FE21. The flow shall also be applied for the relationship rb, sent from FE3 to FE21 via FE25, if FE3 is in another TETRA system. DEFINE information flow is described in table 1.

The service elements Service type, low priority values and high priority values can be repeated in order to define different priority values to different basic services.

Table 1: The service elements within DEFINE information flow

Service element	Type	Remarks
Authorized user	M	
Defined TETRA identities	M	Group or individual identities
Service type	M	May be repeated with the low and high priorities
Low priority value	O	
High priority value	O	
Delivered to MS/LS unit(s)	M	
Acknowledgement from unit(s)	C	

5.1.1.2 DEFINE-ACK

DEFINE-ACK information flow shall be used to acknowledge a previously sent definition request.

The information flow shall be for the relationship rc, from FE21 to FE3. The flow shall also be applied for the relationship rb, from FE21 to FE3 via FE25, if FE3 is in another TETRA network. FE21 shall send an acknowledgement for each requested TETRA identity. That can be done in one or several information flows. DEFINE-ACK information flow is described in table 2.

Table 2: The service elements within DEFINE-ACK information flow

Service element	Type	Remarks
Authorized user	M	
Defined subscriber number(s)	M	Group or individual subscriber number(s)
Result	M	

5.1.1.3 ASSIGN

Optional ASSIGN information flow shall be used to define the call priority value(s) for a TETRA identity. The usage of this information flow is optional to FE1.

The information flow shall be for the relationship ra, from FE21 to FE1. The flow shall be applied for the relationship rb, from FE21 to FE1 via FE25, if FE1 is in another TETRA system. ASSIGN information flow is described in table 3.

The service elements Service Type, low priority values and high priority values can be repeated in order to define different priority values to different basic services, if needed.

The activation/deactivation element shall be used to indicate whether or not the specified SS-PC definition is being activated or deactivated.

Table 3: The service elements within ASSIGN information flow

Service element	Type	Remarks
User A	M	
Activated/Deactivated	M	
Service Type	M	May be repeated with the low and high priorities
Low priority value	O	
High priority value	O	
Acknowledgement requested	M	Requested for the definition

5.1.1.4 ASSIGN-ACK

ASSIGN-ACK information flow should be used to acknowledge the previously received ASSIGN, if acknowledgement was requested.

The information flow shall be applied for the relationship ra, from FE1 to FE21. The flow shall be applied for the relationship rb, from FE1 to FE21 via FE25, if FE1 is in another TETRA system. The ASSIGN-ACK information flow is described in table 4.

Table 4: The service elements within ASSIGN-ACK information flow

Element	Type	Remarks
User A	M	
Activated/Deactivated	M	
Service type	M	
Low priority value	O	
High priority value	O	
Result	M	

5.1.2 Activation/deactivation

The SS-PC activation/deactivation shall be used to activate a SS-PC definition. The SwMI shall use the SS-PC priorities as defined. The SS-PC definition shall be deactivated by defining a priority value that indicates that no priority is used.

When deactivating a SS-PC value, either no priority shall be defined or a pre-defined SS-PC high and low value within the SwMI shall apply for the subscriber identity.

5.1.2.1 ACTIVATE

ACTIVATE information flow shall be used to activate SS-PC.

The information flow is for the relationship rc, from FE3 to FE21. The flow shall also be applied for the relationship rb, sent from FE3 to FE21 via FE25, if FE3 is in another TETRA system. ACTIVATE information flow is described in table 5.

The service elements Service type and SS-PC low and high priority values shall be repeated in order to activate different priority values to different services, if needed.

Table 5: The service elements within ACTIVATE information flow

Service element	Type	Remarks
Authorized user	M	
Defined subscriber number(s)	M	Group or individual subscriber number(s)
Service type	M	
Low priority value	O	
High priority value	O	

5.1.2.2 ACTIVATE-ACK

ACTIVATE-ACK information flow shall be used to acknowledge a previously sent activation request.

The information flow shall be for the relationship rc, from FE21 to FE3. The flow shall also be applied for the relationship rb, from FE21 to FE3 via FE25, if FE3 is in another TETRA network. FE21 shall send an acknowledgement for each requested TETRA identity. That shall be done in one or several information flows. ACTIVATE-ACK information flow is described in table 6.

Table 6: The service elements within ACTIVATE-ACK information flow

Service element	Type	Remarks
Authorized user	M	
Defined subscriber number(s)	M	Group or individual subscriber number(s)
Result	M	

5.1.2.3 DEACTIVATE

DEACTIVATE information flow shall be used to deactivate SS-PC.

The information flow is for the relationship rc, from FE3 to FE21. The flow shall also be applied for the relationship rb, sent from FE3 to FE21 via FE25, if FE3 is in another TETRA system. DEACTIVATE information flow is described in table 7.

Table 7: The service elements within DEACTIVATE information flow

Service element	Type	Remarks
Authorized user	M	
Defined subscriber number(s)	M	Group or individual subscriber number(s)
Service type	M	
Low priority value	M	
High priority value	M	

5.1.2.4 DEACTIVATE-ACK

DEACTIVATE-ACK information flow shall be used to acknowledge a previously sent deactivation request.

The information flow shall be for the relationship rc, from FE21 to FE3. The flow shall also be applied for the relationship rb, from FE21 to FE3 via FE25, if FE3 is in another TETRA network. FE21 shall send an acknowledgement for each requested TETRA identity. That shall be done in one or several information flows. DEACTIVATE-ACK information flow is described in table 8.

Table 8: The service elements within DEACTIVATE-ACK information flow

Service element	Type	Remarks
Authorized user	M	
Defined subscriber number(s)	M	Group or individual subscriber number(s)
Result	M	

5.1.3 Interrogation

An authorized user can interrogate the SS-PC definitions made to the system. The user A may also interrogate his own priorities. The interrogation may be made to a single individual subscriber or to a range or set of subscriber numbers. One interrogated subscriber number can be an individual subscriber number or a group number.

5.1.3.1 INTERROGATE

INTERROGATE information flow shall be used to interrogate the defined call priority value(s) for one TETRA identity or for a range or list of TETRA identities. The interrogating party shall be either an authorized user or a user A. User A is only authorized to interrogate its own SS-PC definitions or definitions made to a group that user A is a member of.

The information flow shall be applied for the relationship rc from FE1 or FE3 to FE21. The flow shall be used for the relationship rb, from FE1 or FE3 to FE21 via FE25, if FE1 or FE3 is in another TETRA system.

Table 9 lists the service elements in the INTERROGATE information flow.

Table 9: The service elements within INTERROGATE information flow

Service element	Type	Remarks
Interrogating user	M	Authorized user/User A
Interrogated subscriber number(s)	M	Group or individual subscriber number(s)

5.1.3.2 INTERROGATE-ACK

INTERROGATE-ACK information flow shall be used to give a response for a SS-PC interrogation. The response includes all defined call priority value(s) and the basic service types, if priorities are separately defined for them.

The information flow shall be applied for the relationship ra or rc from FE21 to FE1 or to FE3. The flow shall be used for the relationship rb from FE21 to FE1 or FE3 via FE25, if FE1 or FE3 is in another TETRA system.

The service elements Service Type, low priority values and high priority values can be repeated in order to indicate different defined priority values to different basic services, if needed.

Table 10 lists the elements in the INTERROGATE-ACK information flow.

Table 10: The service elements within INTERROGATE-ACK information flow

Service element	Type	Remarks
Interrogating user	M	Authorized user/User A
Interrogated subscriber number(s)	M	Group or individual subscriber number(s)
Result for interrogation	M	Successful/Error indication
Activated/deactivated	C	note 1
Service type	C	note 1
Low priority values	C	note 2
High priority values	C	note 2
NOTE 1: The parameter shall be included only if separate activation/deactivation is supported in the system. NOTE 2: A wild card value may be used.		

5.1.4 Operation and invocation

The calling party applies SS-PC by requesting a non-pre-emptive call priority when requesting call invocation. At the reception of the call invocation, FE21 shall verify the call priority, change it if needed and apply it for the call.

FE21 may change the requested call priority, if:

- the requested priority was not authorized;
- as network option, FE1 did not request any priority, FE21 may select the applied priority value;
- as an operator option, FE21 may always change the requested priority, e.g. due to congestion or migrated FE1.

5.1.4.1 PRIORITY1

Calling party shall use PRIORITY1 to request a call priority for a call at call invocation.

The information flow shall be applied for the relationship ra from FE1 to FE21. The flow shall be applied for the relationship ra and rb from FE1 to FE21 via FE25, if FE1 is in another TETRA system. PRIORITY1 information flow uses the call priority information element of the basic call set-up request.

5.1.4.2 PRIORITY2

The SwMI shall use PRIORITY2 to indicate the call priority of the invoked call. The information flow shall be sent to the calling and called parties.

The information flow shall be applied for the relationship ra and rd, from FE21 to FE1 and to FE5. The flow shall also be applied for the relationship rb from FE21 to FE25 (in different TETRA systems) if SS-PC operation extends to several TETRA systems. PRIORITY2 information flow is part of basic call information flows.

5.1.5 Information flows between different TETRA systems

The general principles and mechanism for sending supplementary service information flows between different TETRA systems apply for SS-PC.

5.2 Relationship of SS-PC information flows to other information flows

The SS-PC information flows for definition, activation, deactivation and interrogation between all entities should be sent with U/D-FACILITY PDU.

The call priority shall be included in any circuit mode basic service information flow that can contain the parameter "Call Priority" as defined in EN 300 392-2 [1].

5.3 Service primitives

This clause lists SS-PC service primitives used to invoke or being a result of information flow sequences. The SS-PC service primitives are defined in EN 300 392-12-10 [5] clause 4 and the basic call service primitives are defined in EN 300 392-2 clause 11 [1].

The SS-PC service primitives for user A (FE1) at the MS/LS TNSS-SAP shall be:

- PRIORITY1 request;
- PRIORITY2 indication.

The optional SS-PC primitives for user A (FE1) at the MS/LS TNSS-SAP shall be:

- INTERROGATE request;
- INTERROGATE indication;
- ASSIGN indication;
- ASSIGN response.

The SS-PC service primitives for the authorised user (FE3) at the MS/LS TNSS-SAP shall be:

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

The SS-PC service primitives for the user B (FE5) at the MS/LS TNSS-SAP shall be:

- PRIORITY2 indication.

5.4 Information flow sequences

Signalling procedures shall be provided in support of the information flow sequences showed below. In addition, signalling procedures should be provided to cover other sequences arising from error situations, interactions with basic call, interactions with other supplementary services, different topologies etc.

In figures 4 to 11, SS-PC information flows are represented by solid arrows and related basic air interface information flows are represented by broken arrows. An ellipse embracing two information flows indicates that the two information flows occur together. Within a column representing a SS-PC functional entity, the numbers refer to functional entity actions listed in clauses 5.4.5 and 5.4.8.

No timers are used in figures 4 to 9.

NOTE: The information flow sequences are examples and they may not cover all possible variations of the service.

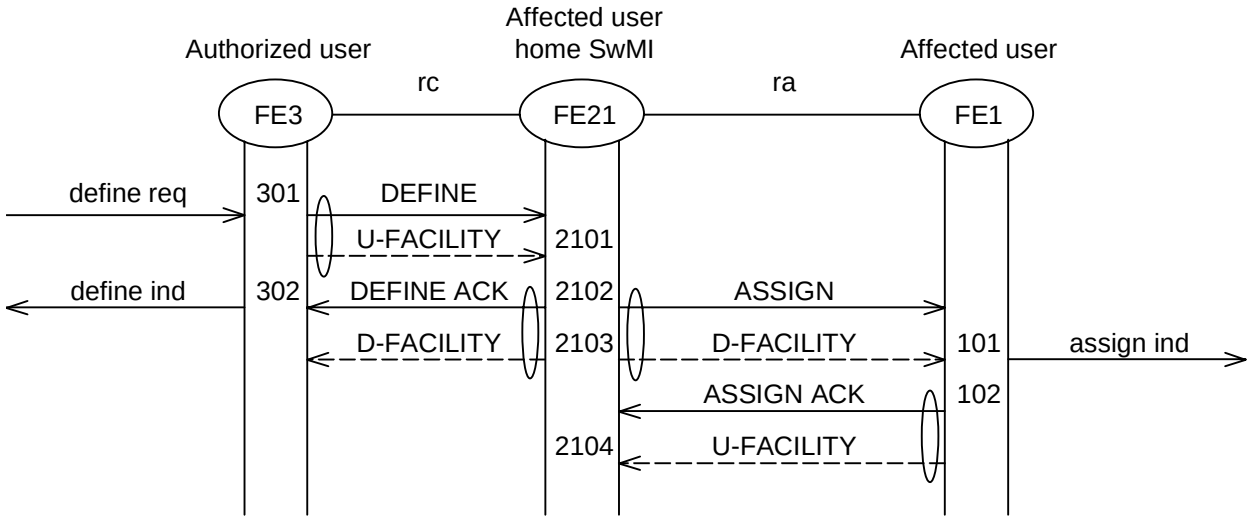
5.4.1 Definition

The ASSIGN/ASSIGN-ACK information flows are optional. If sent, in case of SS-PC definition for a group, the information flow may either be:

- group addressed, in which case the ASSIGN flow is sent. No ASSIGN-ACK flow shall be returned; or
- individual addressed, in which case the ASSIGN/ASSIGN-ACK flow may appear for each group member supporting this information flow.

5.4.1.1 Definition of SS-PC when definition is sent to user A

Figure 4 shows the information flow sequence for normal operation of SS-PC definition when the definition is also sent to user A and when all parties are in one TETRA system.



NOTE: The information flow from FE21 to FE1 is optional.

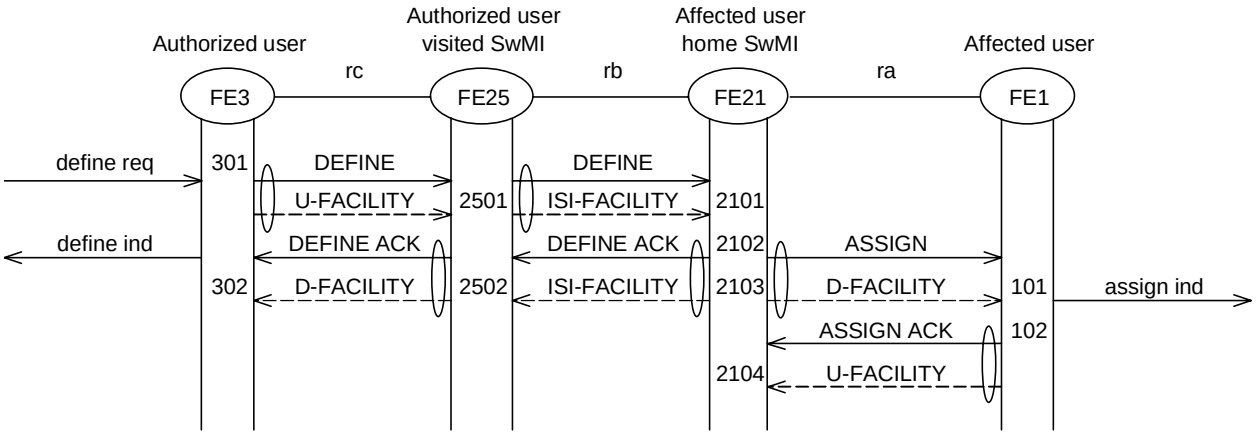
Figure 4: Successful definition of SS-PC

5.4.1.2 Definition when the authorized user is in a visited system

Figure 5 shows the information flow sequence for normal operation of SS-PC definition when the definition is also sent to user A. The authorized user is in a visited system and user A is in the home system. If the user A has migrated into another TETRA system, the DEFINE and DEFINE-ACK information flows shall appear between FE21 and FE3 in the relationship rc and between FE21 and FE25 in the relationship rb.

NOTE: Definitions of priorities for a visited MS, shall be done using relative priorities.

After the SS-PC definition has been concluded, the home system of the defined subscriber identity can send the SS-PC definitions applying the mobility management functions to other TETRA systems (system 2, if any user A is located in system 2) using relative priorities. If this is done, system 2 can use the SS-PC definitions for determining the priority for calls, if invoked for the defined subscriber identity. However, this is outside the scope of the present document.



NOTE: The information flow from FE21 to FE1 is optional and the acknowledgement (ASSIGN–ACK) is only sent, if requested in DEFINE information flow.

Figure 5: Successful definition of SS-PC when an authorized user is in a visited system

5.4.1.3 Definition when user A is in a visited system

Figure 6 shows the information flow sequence for definition of SS-PC when the definition is also sent to user A and when user A is in system 2 and authorized user is in system 1 (home system for the defined subscriber identity). If the served user has migrated into another TETRA system, the DEFINE and DEFINE-ACK information flows shall appear between FE21 and FE3 in the relationship rc and between FE1 and FE25 in the relationship ra.

NOTE 1: Definitions of priorities for a visited MS, shall be done using relative priorities.

After the SS-PC definition has been concluded, the home system of the defined subscriber identity can send the SS-PC definitions applying the mobility management functions to other TETRA systems (system 2 if any user A is located in system 2). If this is done, system 2 can use the SS-PC definitions for determining the priority for calls, if invoked for the defined subscriber identity. However, this is outside the scope of the present document.

NOTE 2: FE25 in system 2 should not keep any SS-PC definitions as part of the generic function tasks when delivering SS-PC definitions when delivering SS-PC definition from system 1 to user A, when user A is located in system 2. If the SS-PC definitions are updated on FE1's behalf to system 2, system 2 should use the definitions to determine the relative priorities when SS-PC is operated for basic services. E.g. if user A invokes a SS-PC with a value corresponding to high priority the operated priority level should correspond to a high priority for that user in system 2.

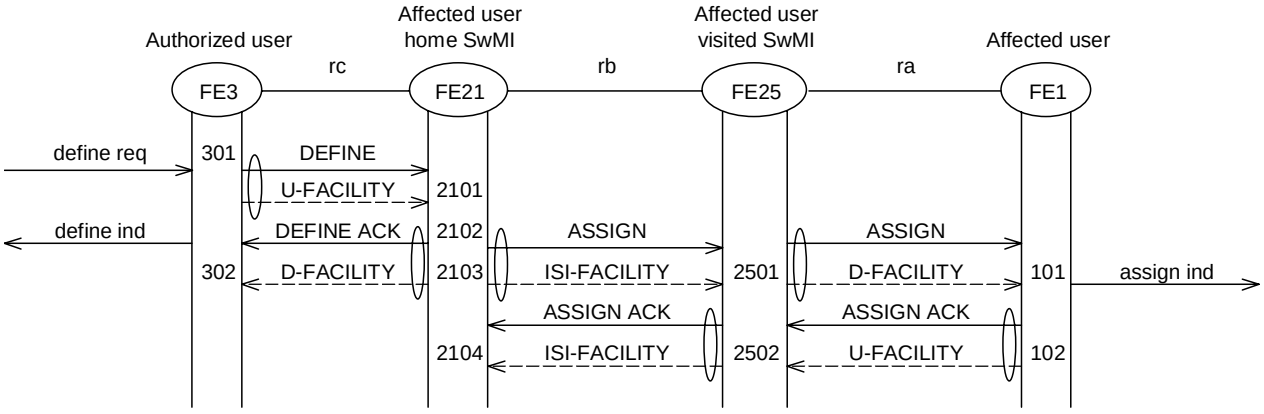


Figure 6: Successful definition of SS-PC when user A is in a visited system

5.4.2 Interrogation

Figure 7 shows the information flow sequence for normal operation of SS-PC interrogation when authorized user is in the home system. If an authorized user requests the interrogation in another TETRA system, the same information flow shall between FE21 and FE25 in the relationship rb.

FE3 may be replaced by FE1.

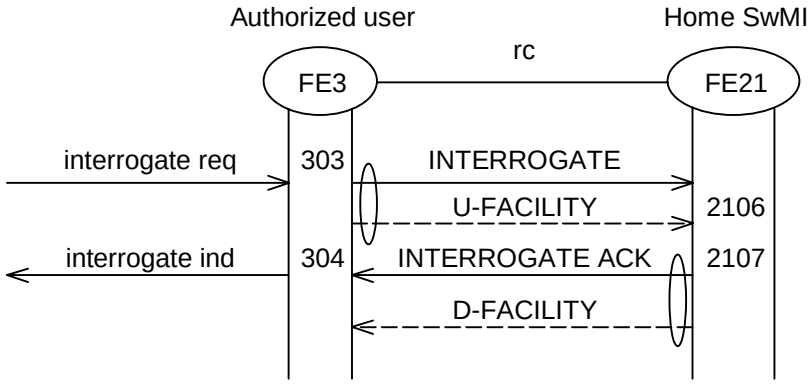


Figure 7: Interrogation of SS-PC

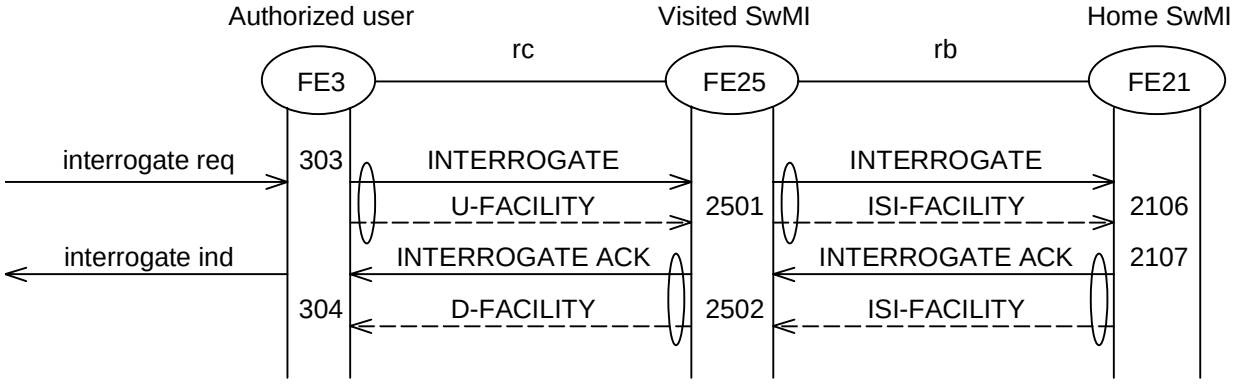


Figure 8: Interrogation of SS-PC over ISI

5.4.3 Activation

Activation is a parameter in the DEFINE, DEFINE ACK, ASSIGN and ASSIGN ACK information flows, refer to clause 5.4.1.

5.4.4 Deactivation

Deactivation is a parameter in the DEFINE, DEFINE ACK, ASSIGN and ASSIGN ACK information flows, refer to clause 5.4.1.

5.4.5 Functional entity actions

5.4.5.1 Functional entity actions of FE1

101 At the reception of SS-PC definition from FE21, FE1 optionally saves the definition to the database of the MS/LS, if FE1 does not find any reason for rejection. FE1 shall only send acknowledgement if it is requested in the ASSIGN information flow.

102 FE1 shall acknowledge the definition request positively, if it finds the request valid. If not, it shall return a negative acknowledgement in accordance to ETS 300 392-9 [2].

5.4.5.2 Functional entity actions of FE21

2101 At the reception of SS-PC definition from FE3, FE21 should verify that the definition request is authorized, its parameters are valid and their values are in allowed range.

2102 FE21 should acknowledge the definition request to FE3 positively, if the service request was successfully carried out. If the service request failed for any reason, FE21 should return a negative acknowledgement to FE3 in accordance to ETS 300 392-9 [2].

2103 As an operation option, FE21 may locate the LS- or MS-subscriber(s) and send them the definition request. FE21 may save the definition data and send it later, if FE1 is not reachable for the moment.

NOTE 1: If user A has migrated to another TETRA system, the step 2105 is also made in order to deliver the ASSIGN information flow to FE1.

2104 FE21 receives the acknowledgement(s) from the FE1(s) to ASSIGN request(s), if acknowledgement to the definition was requested. Step 204 should apply only if step 203 is carried out.

NOTE 2: If SS-PC definition is made for a group, the actions 2103 and 2104 can be carried for each group member, if downloading to group members were requested.

2105 FE2 should add the routing address of FE25 to the SS-PC information flow.

2106 At the reception of SS-PC interrogation, activation or deactivation from FE3, FE21 should verify that the request is authorized, its parameters valid and their values in the allowed range.

2107 If the interrogation request is valid and authorized, FE21 should fetch the interrogation data and return the response to FE3. If the request is not valid or not authorized FE21 should send an error indication to FE3 in accordance to ETS 300 392-9 [2].

2108 If the activation or deactivation request is valid and authorized, FE21 acknowledge the activation or deactivation, respectively, to FE3. If the request is not valid or not authorized FE21 should send an error indication in accordance to ETS 300 392-9 [2].

5.4.5.3 Functional entity actions of FE3

301 At the reception of SS-PC definition request from user application, FE3 may perform local checks for suitability. FE3 may bar the request based on these checks, but if the request is not barred, FE3 shall send it to FE21. If the request is barred locally, FE3 shall indicate the error to the user application.

302 At the reception of the definition acknowledgement, FE3 should indicate it to the user application.

303 At the reception of SS-PC interrogation, activation or deactivation request from user application, FE3 may perform local checks for suitability. FE3 may bar the request based on these checks, but if the request is not barred, FE3 sends it to FE21. If the request is barred locally, FE3 shall indicate the error to the user application.

304 At the reception of the response, or the acknowledgement, FE3 shall indicate it to the user application.

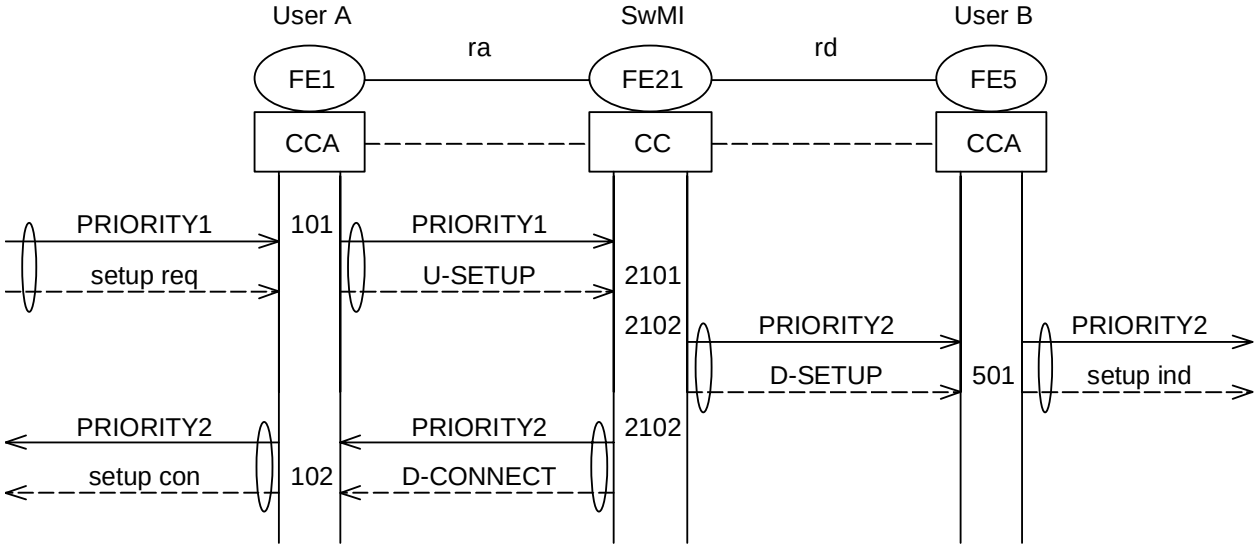
5.4.5.4 ISI Functional entity actions of FE25

2501 FE25 should add the routing address of FE21 to the SS-PC information flow.

2502 FE25 should locate the FE3/FE1 and send the information to it.

5.4.6 Operation for call within one TETRA system

Figure 9 shows the information flow sequence for normal operation of SS-PC applied in call. It applies for both point-to-point and point-to-multipoint call. User A requests the priority and FE2 applies it for the call and indicates this to user A and user Bs. In case of point-to-multipoint call, there are several user Bs, however, only one user B is shown in figure 9. All parties are within one TETRA system.



NOTE: Only the call related messages that convey SS-PC information are shown.

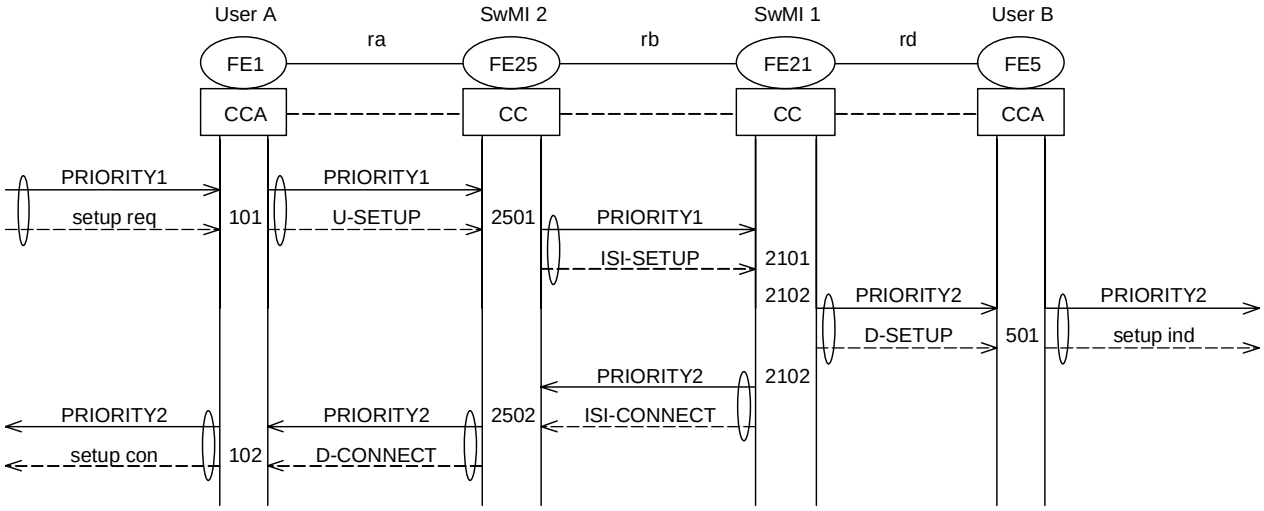
Figure 9: Operation of SS-PC for multipoint call within one TETRA system

5.4.7 Operation for call initiated over Inter-System Interface (ISI)

Figure 10 shows the information flow sequence for normal operation of SS-PC in a call initiated over the ISI. The figure applies for both point-to-point and point-to-multipoint call. User A in SwMI 2 requests the priority. If the call is a point-to-multipoint call SwMI 1 (the controlling SwMI) will verify the priority for the call and indicate the applicable priority to user B(s) in SwMI 1 and to FE25 in SwMI 2. FE25 indicates the priority to user A. If the call is a point-to-point call SwMI 2 (the controlling SwMI) will verify the priority for the call and indicate the applicable priority to FE25 in SwMI 1 and to user A in SwMI 2. FE25 indicates the priority to user B.

In case of point-to-multipoint call there may be several user Bs both in SwMI 2 and SwMI 1, however only one user B is shown in the figure 10. In the case of individual call SwMI 2 is the controlling SwMI and the SS-PC information flow in the ISI-SETUP shall be PRIORITY2. The PRIORITY2 information flow back from SwMI 1 may also be carried with an ISI-CALL PROCEEDING information flow.

NOTE: ISI operation is only valid for circuit mode services.



NOTE: Only the call related messages that convey SS-PC information are shown.

Figure 10: Operation of SS-PC for multipoint call initiated over ISI

5.4.8 Functional entity actions

5.4.8.1 Functional entity actions of FE1

101 At the reception of basic service request from served user, FE1 shall verify and set the call priority as defined for the basic service.

102 At the reception of the basic service invocation, FE1 and CCA shall receive the call priority value and shall act upon that. FE1 can display the call priority to the user.

5.4.8.2 Functional entity actions of FE21

2101 At the reception of service request, FE21 should verify and/or assign the call priority that will be applied for the service.

2102 At service invocation, FE21 shall send the call priority to the parties that participate the call.

5.4.8.3 Functional entity actions of FE25

2501 FE25 shall send the service request to the controlling SwMI, FE21 over ISI.

2502 At the reception of the applied call priority, FE25 shall send it to the parties participating in the call.

5.4.8.4 Functional entity actions of FE5

501 At the reception of the basic service invocation, FE5 and CCA shall receive the call priority value and shall act upon that. FE5 may display the call priority to the user.

6 Allocation of FEs to physical equipment

The allocation of FEs to physical equipment is described in table 11. Other means of SS-PC management are optional and outside the scope of the present document.

Table 11: Allocation of FEs to physical equipment during SS-PC Management

Equipment/Function	SS-PC Management	SS-PC Operation
SwMI	FE2 (Optional)	FE2 (Mandatory)
MS/LS	FE3 (Optional)	FE1 (Mandatory) FE5 (Optional)

7 Inter-working considerations

7.1 Management and operation

The SS-PC may extend to several TETRA networks. The requirements for the management part for the visited system shall be to deliver and receive SS-PC definition information over the ISI and transfer the information to user A or authorized user.

The requirements for the operational part of SS-PC include the capability to support the functions of FE2x in call set-up.

7.2 Migration

Upon individual user migration the home SwMI may send user related SS-PC profile to the visited SwMI and the visited SwMI may response with a modified temporary profile, refer to ETS 300 392-3-5 [3].

Figure 11 shows SS-PC information exchange during migration.

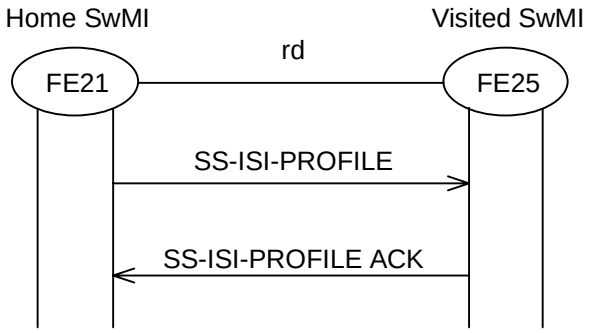


Figure 11: SS-PC profile exchange between SwMIs

History

Document history			
Edition 1	August 1996	Public Enquiry	PE 111: 1996-08-05 to 1996-11-29
	March 2001	Converted to an EN between Public Enquiry and Vote	
V1.1.1	March 2001	Vote	V 20010525: 2001-03-26 to 2001-05-25