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Terrestrial Trunked Radio (TETRA);
Voice plus Data (V+D);
Part 11: Supplementary services stage 2;
Sub-part 16: Pre-emptive Priority Call (PPC)

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Reference

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Project Terrestrial Trunked Radio (TETRA).

The present document is part 11, sub-part 16 of a multi-part deliverable covering Voice plus Data (V+D), as identified below:

EN 300 392-1:   "General network design";

EN 300 392-2:   "Air Interface (AI)";

EN 300 392-3:   "Interworking at the Inter-System Interface (ISI)";

ETS 300 392-4:   "Gateways basic operation";

EN 300 392-5:   "Peripheral Equipment Interface (PEI)";

EN 300 392-7:   "Security";

EN 300 392-9:   "General requirements for supplementary services";

EN 300 392-10:   "Supplementary services stage 1";

EN 300 392-11:   "Supplementary services stage 2";

    Sub-part 1:   "Call Identification (CI)";

    Sub-part 2:   "Call Report (CR)";

    Sub-part 3:   "Talking Party Identification (TPI)";

    Sub-part 4:   "Call Forwarding (CF)";

    Sub-part 5:   "List Search Call (LSC)";

    Sub-part 6:   "Call Authorized by Dispatcher (CAD)";

    Sub-part 7:   "Short Number Addressing (SNA)";

    Sub-part 8:   "Area Selection (AS)";

    Sub-part 9:   "Access Priority (AP)";

    Sub-part 10:   "Priority Call (PC)";

    Sub-part 11:   "Call Waiting (CW)";

    Sub-part 12:   "Call Hold (HOLD)";

    Sub-part 13:   "Call Completion to Busy Subscriber (CCBS)";

Sub-part 14:   "Late Entry (LE)";

Sub-part 16:   "Pre-emptive Priority Call (PPC)";

Sub-part 17:   "Include Call (IC)";

Sub-part 18:   "Barring of Outgoing Calls (BOC)";

Sub-part 19:   "Barring of Incoming Calls (BIC)";

Sub-part 20:   "Discreet Listening (DL)";

Sub-part 21:   "Ambience Listening (AL)";

Sub-part 22:   "Dynamic Group Number Assignment (DGNA)";

Sub-part 23:   "Call Completion on No Reply (CCNR)";

Sub-part 24:   "Call Retention (CRT)";

EN 300 392-12: "Supplementary services stage 3";

ETS 300 392-13: "SDL model of the Air Interface (AI)";

ETS 300 392-14: "Protocol Implementation Conformance Statement (PICS) proforma specification";

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

TS 100 392-16: "Network Performance Metrics";

TS 100 392-17: "TETRA V+D and DMO Release 1.1 specifications".

NOTE: Part 13 (SDL) and part 14 (PICS) of this multi-part are of status "historical" and will not be updated according to this version of the standard.

National transposition dates	
Date of adoption of this EN:	17 September 2004
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Date of withdrawal of any conflicting National Standard (dow):	30 June 2005

1 Scope

The present document defines the stage 2 specifications of the Supplementary Service Pre-emptive Priority Call (SS-PPC) for the TErrestrial Trunked Radio (TETRA).

SS-PPC enables a user to have preferential access to the network resources in a TETRA system in times of congestion including pre-emption of calls. SS-PPC is applicable for pre-emptive priorities including the emergency priority. SS-PPC includes the capability to pre-empt resources needed for higher priority calls and the capability to pre-empt users from ongoing calls in order to move them to higher priority calls. SS-PPC specifies the definition, activation, deactivation and interrogation for the usage of pre-emptive call priorities in the TETRA system. The Switching and Management Infrastructure (SwMI) applies the SS-PPC priorities when it allocates the resources for calls. The SS-PPC operations are defined for the SwMI and for the Mobile Station (MS).

SS-PPC is defined to 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-PPC also is invoked for calls within one TETRA system or for calls that extend over ISI to several TETRA systems.

Man-Machine Interface (MMI) and charging principles are outside 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 and in the MS. 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 and in the MS.

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.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

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

[2] ETSI EN 300 392-10-16: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 16: Pre-emptive Priority Call (PC)".

[3] ETSI EN 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)".

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

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

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-PPC

emergency priority: highest pre-emptive priority

pre-emption: exclusion of one or more parties from an ongoing service due to a SS-PPC operation for another service

NOTE: The pre-emption is carried out due to the lack of resources or due to the need to join a called party to a higher priority pre-emptive call. The users may be warned of the impending pre-emption or indicated, if any party is pre-empted from the ongoing call.

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

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

NOTE: The called user may be pre-empted user from another call.

user C: pre-empted user, a user that is involved in a call, which is pre-empted due to lack of resources for a SS-PPC

NOTE: There may be one, two or more pre-empted users in a pre-empted call.

user D: remaining user or users in a call from which a user or users have been pre-emptied

3.2 Abbreviations

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

CC	Call Control functional entity
CCA	Call Control functional entity Agent
CRV	Call Retention Value
CMCE	Circuit Mode Control Entity
FE	Functional Entity
ISI	Inter-System Interface
LS	Line connected Station
MMI	Man-Machine Interface
MS	Mobile Station
PDU	Protocol Data Unit
SS-PPC	Supplementary Service Pre-emptive Priority Call
SwMI	Switching and Management Infrastructure

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-PPC.

The functional model shall comprise the following FEs:

FE1	user A's (calling party's) FE;
FE21	SS-PPC 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 pre-emptive 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-PPC is operated. The called user may be pre-empted party FE8 of
         another call either due to lack of resources or the user is pre-empted to be joined to the pre-emptive
         priority call.

FE25   SS-PPC FE in user B's SwMI;
FE8   user C's (pre-empted party's) FE;

NOTE 3: Pre-empted user, a user that is involved in a call which is pre-empted due to lack of resources.

FE9   user D's (remaining party's) FE;

NOTE 4: Remaining user or users in a call from which a user or users have been pre-emptied.

CC Call Control FE in SwMI.
CCA Call Control Agent FE in MS/LS.

NOTE 5: The above FEs has been numbered in accordance with EN 300 392-9 [4].

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;
re   between FE21/FE25 and FE8;
rf   between FE21/FE25 andFE9.

Figure 1 shows these FEs and the possible relationships for the management part and figure 2 for the operational part.
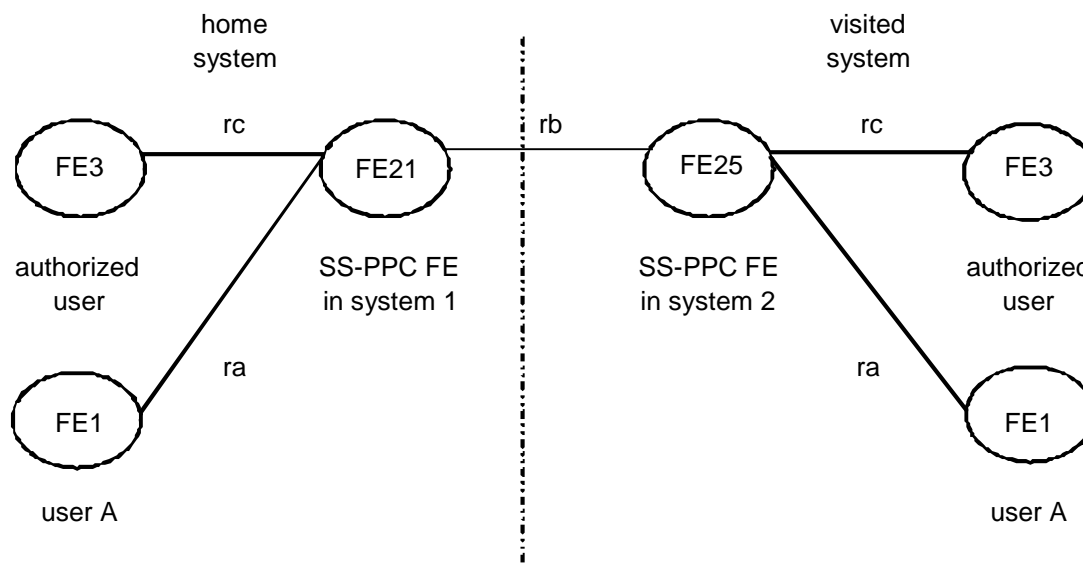
Figure 1: The relations and the FEs of the management part of SS-PPC
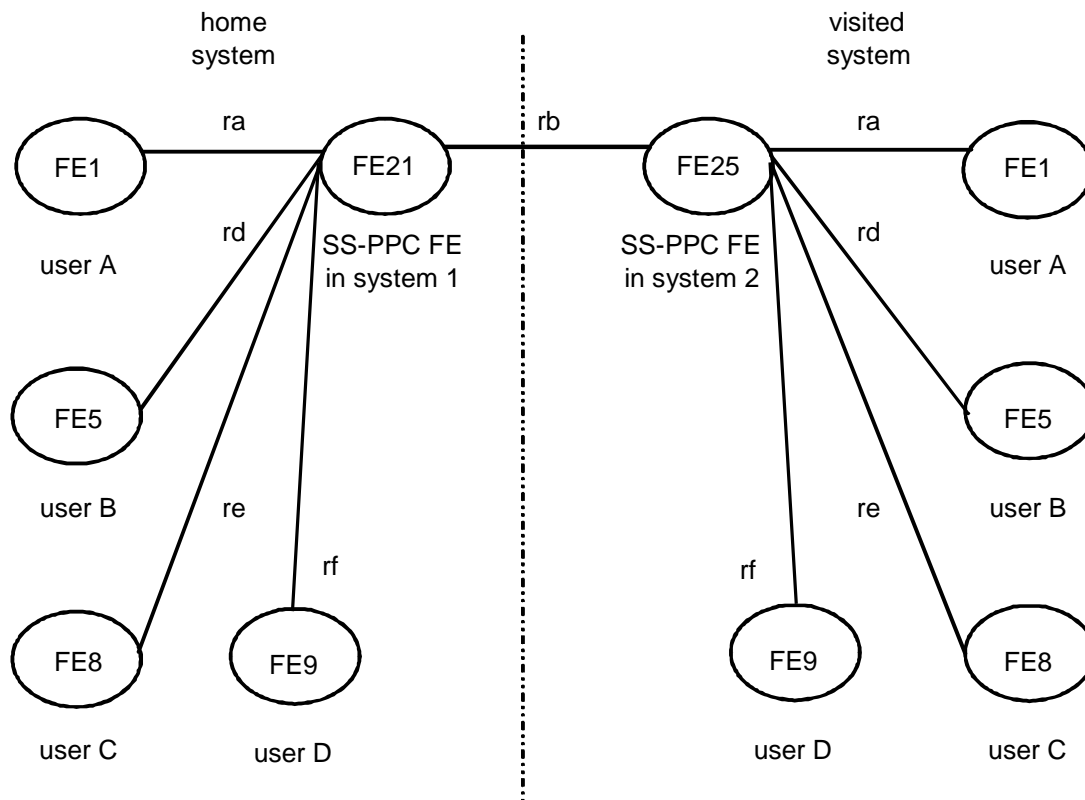
Figure 2: The relations and FEs of the operational part of SS-PPC

4.2 Description of functional entities

4.2.1 User A's FE, 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-PPC definition from FE21. Upon acceptance, FE1 shall pass the SS-PPC definition request, to the user application and acknowledge the SS-PPC definition, if FE21 has requested this;

- as an option, the MS/LS supports SS-PPC interrogation, FE1 shall pass the SS-PPC interrogation request to FE21, when the user application issues it.

The functional tasks for operation of FE1 for pre-emptive priority individual and group call request shall be as follows:

- upon reception of the SS-PPC invocation from the user application within a call set-up, FE1 shall send the SS-PPC invocation to the SwMI (FE21) with the call set-up;

- upon reception of a SS-PPC confirmation from FE21, FE1 shall pass the SS-PPC confirmation to the user application.

4.2.2 SS-PPC FE 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-PPC 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-PPC 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-PPC definition to FE1(s), FE21 shall then send the corresponding requests to the concerned FE1s and may receive their acknowledgements;

- at the reception of an SS-PPC interrogation request from either FE3 or FE1, FE21 should verify the request and send the response to FE3 or FE1.

4.2.3 SS-PPC FE in the controlling SwMI, FE21

The functional tasks for operation of FE21 for pre-emptive priority individual and group calls shall be as follows:

- when FE21 receives a call set-up request with the SS-PPC invocation, FE21 shall verify the received priority and change it, if needed. However FE21 should not change it when it corresponds to the highest SS-PPC priority value, i.e. emergency;

- FE21 shall determine if pre-emption is needed to gain resources to the invoked SS-PPC call. If yes, FE21 may first send an impending pre-emption indication to FE8(s) and shall then send a pre-emption indication;

- FE21 shall send the SS-PPC call set-up, with its pre-emptive priority value to the called party/parties (FE5);

- optionally, FE21 may send the impending pre-emption indication to:

    - the called party (FE5) of an individual SS-PPC call before or together with the SS-PPC call set-up; or

    NOTE 1: This only applies when the called party of the individual PPC call is registered in FE21.

    - the called parties (FE5s) of a group SS-PPC call before the SS-PPC call set-up, when the called party/parties (FE5) are active in another call.

    NOTE 2: Impending pre-emption indication sent together with a SS-PPC group call set-up is not applicable.

The impending pre-emption indication shall be followed by a pre-emption indication when the impending pre-emption indication was sent together with the SS-PPC call set-up, otherwise the individual SS-PPC call set-up shall follow the impending pre-emption indication:

- when pre-empting the called party from an individual call, FE21 shall ensure that the individual call is released;

- if the pre-empted party/parties was/were engaged in a group call, FE21 may indicate to the remaining participants (FE9) in this group call that this/these pre-empted party/parties (FE5) is/are disconnected from the group call. If participating SwMIs (FE25s) exist the user pre-emption indication may be sent to FE25s;

- if the SS-PPC call attempt has been successful, FE21 shall send the SS-PPC priority to the calling party.

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

The are no functional tasks of FE25 for definition, activation, deactivation and interrogation 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-PPC 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-PPC call set-up, with the pre-emptive priority value received from FE21, to the called party/parties;

- if SS-PPC is supported in FE25, FE25 shall determine if pre-emption is needed to gain resources or party/parties to the invoked SS-PPC call:

    - if pre-emption is needed to gain resources, FE25 may send an impending pre-emption indication to FE8(s) and shall then send a pre-emption indication;

    - optionally, if pre-emption is needed because the called party (FE5) of a SS-PPC individual call is busy, FE25 may send the impending pre-emption indication to the called party (FE5) before or together with the SS-PPC call set-up. The impending pre-emption indication shall be followed by a pre-emption indication when the impending pre-emption indication was sent together with the SS-PPC call set-up, otherwise the individual SS-PPC call set-up shall follow the impending pre-emption indication;

- when pre-emption of a called group is required, FE25 may optionally receive the impending pre-emption and shall receive the SS-PPC group call set-up indication from the group controlling SwMI, FE21. If impending pre-emption indication is supported, FE25 should send this indication to the called parties (FE5s). The impending pre-emption indication shall be followed by the SS-PPC group call set-up indication.

NOTE: Impending pre-emption indication sent together with a SS-PPC group call set-up is not applicable.

- when pre-empting the called party from an individual call, FE25 shall ensure that the individual call is release;

- if the pre-empted party/parties (FE5s) was/were engaged in a group call, FE25 may indicate to the remaining participants (FE9) in this group call registered in this SwMI that this/these pre-empted party/parties is/are disconnected from the group call. FE25 may also indicate to FE21 (the controlling SwMI of the pre-empted call) that called users (FE5s) have been pre-empted.

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-PPC definition, activation, deactivation or interrogation requests from the user application, FE3 shall send them to FE21;

- upon reception of the SS-PPC 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-PPC call attempt, FE5 shall indicate the SS-PPC priority of the call to the user application;

- FE5 shall compare the priority value of the active call with the SS-PPC priority of the incoming call and FE5 shall join the SS-PPC call or leave the decision of joining to the user application as defined in EN 300 392-10-16 [2], clause 4.1.1;

- optionally, FE5 shall upon reception of an impending pre-emption indication carried by the SS-PPC call set-up, indicate the forthcoming pre-emption to the user application and should either:

  - end the existing call when this call is an individual call or drop out of the group call and then follow the indicated SS-PPC call; or

  - wait for the pre-emption indication. Upon reception of the pre-emption indication FE5, shall follow the PPC call.

- optionally, FE5 shall upon reception of an impending pre-emption indication without an SS-PPC call set-up, indicate the forthcoming pre-emption to the user application and should either:

  - end the existing call when this call is an individual call or drop out of the group call; or

  - wait for the SS-PPC call set-up request. Upon reception of the SS-PPC call set-up request, FE5 shall follow the PPC call.

4.2.7   User C's (pre-empted party) FE, FE8

The functional tasks of FE8 shall be the following:

- upon reception of an impending pre-emption indication, FE8 shall indicate the forthcoming pre-emption to the user application and should either:

    - end the existing call when this call is an individual call or drop out of the group call; or

    - wait for the pre-emption indication.

- upon reception of a pre-emption indication, FE8 shall indicate the pre-emption to the user application.

4.2.8   User D's (remaining party) FE, FE9

Upon reception of the (optional) indication by FE21/FE25 of user pre-empted during a call, FE9 shall pass it to the user application.

4.3   Relationship of functional model to basic call functional model

In the case of SS-PPC invocation, FE1 shall be collocated with CCA at a service invocation.

In the case of SS-PPC operation, FE2x shall be collocated with CC.

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

In the case of service SS-PPC pre-emption, FE8 shall be collocated with CCA.

In the case of remaining user during SS-PPC operation, FE9 shall be collocated with CCA.

Figure 3 shows the different relationships that may exist between FEs and CC/CCA.
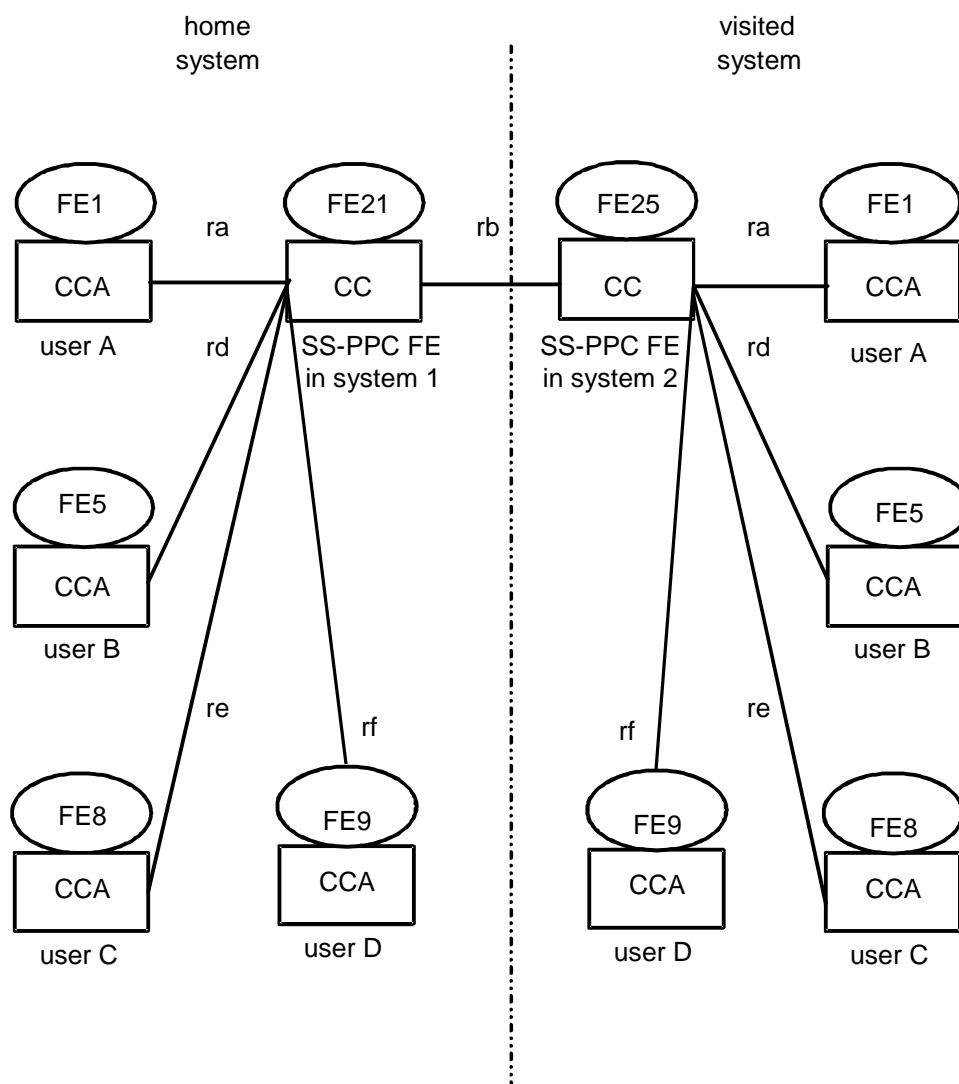
NOTE: The routes defined between FEs are applicable also for the CCs/CCAs to which the FEs is collocated.

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

5 Information flows

5.1 Definition of information flows

In the tables listing the service elements in 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.

The listed service elements shall specify whether the information of each element is included in the flow.

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 EN 300 392-12-16 [3].

5.1.1   Definition

An authorized user shall be able to define SS-PPC to be saved in a TETRA system. The SS-PPC definition shall specify the usage of pre-emptive priorities applied for services and the subscriber identities on which behalf the definition is made. SS-PPC shall be definable for circuit mode services and SS-PPC defines the pre-emptive priority values for these services including the emergency value.

The SS-PPC definition shall be made to a single individual subscriber or to a range or list of individual subscribers. The definition shall also be made to one group or to a range or list of groups. It should be possible to define two separate group priority values, one used for pre-emptive priority group calls initiated by a group member and one used for pre-emptive priority group calls initiated by non-group members. If the SS-PPC definition is made to a subscriber, the definition shall apply for the individual calls that the subscriber makes.

The priority values may be defined separately to different services or a common value may be defined to these services. All the priority values that are defined by SS-PPC shall be pre-emptive. The highest definable priority value shall be considered as emergency value.

The defined priority value shall indicate the highest value that the MS/LS is allowed to use. However, the SS-PPC definition shall not restrict to usage of emergency priority.

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-PPC definition to user A is on optional feature for FE2x; FE1 may recognize the information flow. Assign indication is an optional feature for the MS.

A new definition shall override an older definition.

NOTE: It is possible that some networks prefer a different process for handling the definitions.

5.1.1.1   DEFINE

DEFINE information flow shall be used to define SS-PPC.

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. DEFINE information flow is described in table 1.

The service elements service type and SS-PPC priority value may be repeated in order to define different priority values to different services.

Table 1: The service elements within DEFINE information flow

Service element	Type	Remarks
Authorized user	M	
Defined subscriber number(s)	M	Group or individual subscriber number(s)
Service type	M	
SS-PPC priority value	M	
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 system. FE21 shall send an acknowledgement for each requested TETRA identity. That shall 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

ASSIGN information flow shall be used to define the call priority value(s) for a TETRA identity. The usage of this information flow shall be 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 and SS-PPC priority value shall be repeated in order to define different priority values to different services, if needed.

The activation/deactivation element shall be used to indicate whether or not the specified SS-PPC 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	
SS-PPC priority value	M	
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

Service element	Type	Remarks
User A	M	
Activated/Deactivated	M	
Service type	M	
SS-PPC priority value	M	
Result	M	

5.1.2 Activation/deactivation

The SS-PPC activation/deactivation shall be used to activate a SS-PPC definition. The SwMI shall use the SS-PPC priorities as defined. Defining a priority value that indicates that no priority is used shall deactivate the SS-PPC definition.

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

5.1.2.1 ACTIVATE

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

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-PPC priority value 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	
SS-PPC 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-PPC.

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

5.1.3.1 INTERROGATE

INTERROGATE information flow shall be used to interrogate the defined SS-PPC 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-PPC definitions or definitions made to a group, that user A is a member of.

The information flow shall be applied for the relationship ra or 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 an SS-PPC interrogation. The response includes all defined call priority value(s) and the service types, if priorities are separately defined for those.

The information flow shall be applied for the relationship ra or rc and 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 and SS-PPC priority value shall be repeated in order to indicate different defined priority values to different services, if needed.

Table 10 lists the service 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
Defined subscriber number(s)	M	Group or individual subscriber number(s)
Result for interrogation		Successful/Error indication
Activated/deactivated	C	See note 1
Service type	C	See note 2
SS-PPC priority value	C	See note 2
Delivered to MS/LS units	M	
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 SS-PPC priority shall be invoked and operated for circuit mode switched services.

SS-PPC shall be invoked and operated in one of the following ways:

-        if the calling party invokes SS-PPC with emergency priority, the SwMI (FE21) should establish the service
         with the emergency priority;

-        if the calling party invokes SS-PPC with a non-emergency pre-emptive priority, FE21 verifies and approves
         the priority and operates SS-PPC by using the pre-emptive value for the service.

FE21 and FE25 when applicable shall indicate the applied priority to user A and user B(s).

FE21 should use the priority level requested by FE1, However, FE21 may change the requested call priority, if:

-        the requested priority was not authorized;

-        as a network option, if FE1 did not request any priority, FE21 may select the applied priority value;

-        as an operator option, FE21 may always apply a different priority than the requested priority, e.g. in special
         circumstances where some user groups are favoured for resource allocation.

If a calling party requests a service with emergency priority, FE21 should not change the priority value.

5.1.4.1   Pre-emption

5.1.4.1.1   General on pre-emption

When an SS-PPC call is invoked, FE21/FE25 may pre-empt any resource that it controls for the SS-PPC call.
FE21/FE25 may pre-empt members engaged to other calls to join them to pre-emptive calls, if needed.

If a party is pre-empted from an individual call, either FE5 or FE21/FE25 shall disconnect the individual call using
basic call signalling. If a party is pre-empted from a group call, FE5 normally leaves the call without any signalling to
FE21/FE25 and the group call continues. If appropriate, then either FE5 or FE21/FE25 may disconnect the group call.

The impending pre-emption indication as described in clauses 5.2.4.1.2 and 5.2.4.1.3 is an optional feature for the
SwMI and MS.

5.2.4.1.2   Resource pre-emption

The pre-emption of resources shall take place in one of the two ways:

-        the pre-empted party or parties (FE8) are first given an impending pre-emption indication and pre-empted
         0 s to 10 s after that, and upon pre-emption, a disconnection cause indicating pre-emption will be given to the
         pre-empted party/parties; or

-        the pre-empted party or parties (FE8) are pre-empted immediately and given a disconnection cause indicating
         pre-emption.

NOTE: If there are multiple established calls, FE21/FE25 may use the Call Retention Value (CRV) to determine
             which call the SS-PPC call should pre-empt.

The network can use a different process to determine the priority for the allocation of resources.

5.2.4.1.3   Called User pre-emption

5.1.4.1.3.1   General on called user pre-emption

A called party (FE5) may be pre-empted from an ongoing call by sending a SS-PPC call invocation with a higher
SS-PPC value than the one of the ongoing call. FE5 shall compare the priorities and may join the invoked call, if it has a
higher SS-PPC priority, as defined in clause 4.2.6.

5.1.4.1.3.2   Individual SS-PPC call

The pre-emption of a called user shall take place in one of the two ways for **SS-PPC individual calls**:

-       the pre-empted party is given an impending pre-emption indication by the terminating SwMI of the PPC call, followed by pre-emption 0-10 seconds after that; and

-       when the impending pre-emption is carried in the SS-PPC individual call set-up, pre-emption will occur by disconnecting the pre-empted user from the call this user currently is active in. The disconnection request shall indicate pre-emption; or

-       a SS-PPC individual call set-up will be given to the pre-empted party when the SS-PPC call set-up was not carried in the impending pre-emption; or

-       the pre-empted party is pre-empted immediately by the terminating SwMI of the PPC call and given a SS-PPC call set-up.

   In addition

-       when the called user (FE5) is pre-empted from a group call, the terminating SwMI (FE25) of the individual PPC call does not need to inform the group controlling SwMI of user disconnection. See EN 300 392-3-3 [5] for group call handling over ISI;

-       when the called user (FE5) is pre-empted from an individual call, the terminating SwMI (FE25) of the individual PPC call, shall inform the other end SwMI of the pre-empted individual call, of user disconnection. The disconnection indication shall indicate pre-emption.

5.1.4.1.3.3   Group SS-PPC call

The pre-emption of called users shall take place in one of the two ways for **SS-PPC group calls**:

-       the pre-empted parties are given an impending pre-emption indication by the controlling SwMI of the PPC call, followed by pre-emption 0 s to 10 s after that and upon pre-emption, a SS-PPC group call set-up will be sent to the pre-empted parties from the controlling SwMI of the PPC call. Impending pre-emption carried in an SS-PPC group call set-up shall not be supported; or

-       the pre-empted parties are pre-empted immediately by the controlling SwMI of the PPC call and given an SS-PPC call set-up.

In addition:

-       when a called user (FE5) is pre-empted from a group call, the participating SwMI (FE25) of the PPC group call does not need to inform the group controlling SwMI of the pre-empted call, of user disconnection. See EN 300 392-3-3 [5] for group call handling over ISI;

-       when a called user (FE5) is pre-empted from an individual call, pre-empted group members shall indicate call disconnection to other end SwMI(s) for all individual calls that the called user was participating in. The disconnection indication shall indicate pre-emption.

If one or more parties are pre-empted from an ongoing call so that the ongoing call shall continue, the parties (FE9) of the ongoing call may be sent an information flow indicating the disconnection of the pre-empted party (FE5). User pre-emption indication is an optional feature for the SwMI and MS.

At the reception of the confirmation of service invocation, FE1 shall indicate the applied priority level to the user application.

5.1.4.2   Exceptional situations

It is possible, that FE21/FE25 cannot allocate resources for the SS-PPC call. FE21/FE25 may either put the requested service in a queue or reject the service request. In case of group call, FE21 may also set-up the call partially and complete the set-up when the needed resources are available.

It is also possible, that FE21 cannot join all parties to the requested service, if one or more parties are engaged in calls with higher priority. FE21 may indicate to the calling party and all other group members, that all members have not joined the call.

During call set-up, if a SwMI FE25, i.e. either terminating in the case of an individual call or participating in the case of a group call, does not support SS-PPC, the SwMI shall indicate back to FE21 that the service is not supported, according to EN 300 392-9 [4].

5.1.4.3   PRIORITY1

Calling party shall use PRIORITY1 to request the pre-emptive 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 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.

5.1.4.4   PRIORITY2

The SwMI shall use PRIORITY2 to indicate the priority level 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 the SS-PPC operation extends to several TETRA system. PRIORITY2 information flow is part of basic call information flows.

5.1.4.5   IMPENDING-PRE-EMPTION

Optionally, the SwMI may use IMPENDING-PRE-EMPTION to indicate the impending pre-emption. The information flow shall be sent to the pre-empted parties.

The information flow shall be applied for the relationship ra and re, from FE21/FE25 to FE5 or FE8. The flow may also be applied for the relationship rb, from FE21 to FE25 (in different TETRA systems) if the SS-PPC operation extends to several TETRA systems. IMPENDING-PRE-EMPTION information flow is described in table 11.

Table 11: The service elements within IMPENDING-PRE-EMPTION information flow

Service element	Type	Remarks
Receiving party	M	User C, User B
Impending pre-emption indication	M	
Remaining time to pre-emption	O	

5.1.4.6   PRE-EMPTION

FE21/FE25 shall send PRE-EMPTION to indicate the pre-emption and the termination of the call. The information flow shall be sent to the pre-empted parties.

The information flow shall be applied for the relationship re, from FE21/FE25 to FE8. The flow shall also be applied for the relationship rb and from FE21 to FE25 (in different TETRA systems) if the SS-PPC operation extends to several TETRA systems. PRE-EMPTION information flow uses the disconnect cause of the basic call disconnect request/release indication.

FE21/FE25 can replace Disconnection indication by queue indication, if FE8 is pre-empted from the call due to lack of resources.

5.1.4.7 USER-PRE-EMPTED

USER-PRE-EMPTED indication may be applied for the relationships ra and rf, from FE21/FE25 to FE9. The flow shall be applied for the relationship rb, between two FE2xs located in different TETRA systems, if participants of the call (FE1, FE9(s)) are located in different TETRA systems.

If the indication is sent, it may be sent to some or all participants of the pre-empted call.

USER-PRE-EMPTED information flow is described in table 12.

Table 12: The service elements within USER- PRE-EMPTED information flow

Service element	Type	Remarks
Receiving party	M	Group, Individual subscriber
Pre-empted party number	C	See note
One or more pre-empted parties	C	See note
NOTE: The information flow included either the pre-empted party subscriber number, or the information that one or more parties have been pre-empted from the call without giving the pre-empted party(ies) subscriber identity(ies).		

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-PPC.

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

The SS-PPC information flows for definition, activation, deactivation and interrogation between all entities should be sent with U/D-FACILITY PDU or any Circuit Mode Control Entity (CMCE) service PDU that is able to include SS-FACILITY element.

The SS-PPC information flows used during invocation and operation shall be included in basic call information flows as shown in table 13. In general, pre-emptive priority shall be included in any circuit mode service information flow that contains the parameter "Call Priority" as defined in EN 300 392-2 [1], clause 14.

Table 13: The relationship between SS-PPC information flows and basic service information flows

Information flow	Independent of basic call flow	Basic call flow
PRIORITY1	no	U-SETUP
PRIORITY2	no	D-SETUP or D-CONNECT
IMPENDING-PRE-EMPTION	no	D-SETUP or D-INFO
PRE-EMPTION	no	D-RELEASE
USER-PRE-EMPTION	no	D-INFO

5.3 Service primitives

This clause lists SS-PPC service primitives used to invoke or being a result of information flow sequences. The SS-PPC service primitives are defined in EN 300 392-12-16 [3], clause 5.2 and the basic call service primitives are defined in EN 300 392-2 [1], clause 11.

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

   a)   PRIORITY1 request;

   b)   PRIORITY2 indication.

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

    a)   INTERROGATE request;

    b)   INTERROGATE indication;

    c)   ASSIGN indication;

    d)   ASSIGN response.

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

    a)   DEFINE request;

    b)   DEFINE indication;

    c)   INTERROGATE request;

    d)   INTERROGATE indication.

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

    a)   PRIORITY2 indication;

    b)   PRE-EMPTION indication.

The optional SS-PPC primitive for user B (FE5) at the MS/LS TNSS-SAP shall be:

    a)   IMPENDING PRE-EMPTION indication.

The SS-PPC primitive for the user C (FE8) at the MS/LS TNSS-SAP shall be:

    a)   PRE-EMPTION indication.

The optional SS-PPC primitives for the pre-empted user (FE8) at the MS/LS TNSS-SAP shall be:

    a)   IMPENDING-PRE-EMPTION indication.

The optional SS-PPC primitives for the user (FE9) remaining in a call after pre-emption at the MS/LS TNSS-SAP shall be:

    a)   USER-PRE-EMPTED indication.

The activation and deactivation shall be done with the DEFINE request; the acknowledgement for activation and deactivation shall be done with DEFINE indication.

5.4 Information flow sequences

Signalling procedures shall be provided in support of the information flow sequences shown 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 the figures, solid arrows represent the SS-PPC information flows and broken arrows represent basic call information flows. An ellipse embracing two information flows indicates that the two information flows occur together. Within a column representing an SS-PPC FE, the numbers refer to FE actions listed in clauses 4.3.2 and 4.3.7.

The information flow sequences for the SS-PPC call in this clause describe the SS-PPC specific behaviour for the basic services. These sequences complement the basic service behaviour described in EN 300 392-2 [1], clauses 11 and 14.

No timers are used in the figures.

    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-PPC 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-PPC when definition is sent to user A

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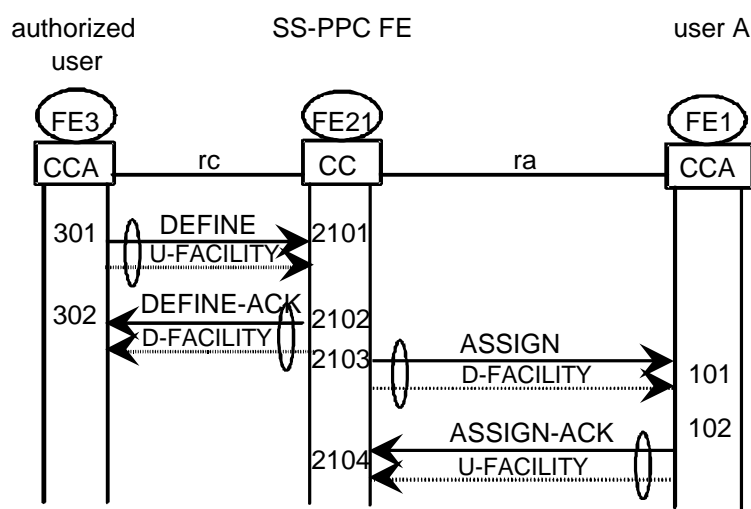

Figure 4: Successful definition of SS-PPC

5.4.1.2   Definition when authorized user is in visited system

Figure 5 shows the information flow sequence for normal operation of the SS-PPC definition when the definition is also sent to user A. The authorized user is in visited system and user A is in the home system.

After the SS-PPC definition has been concluded, the home system of the defined subscriber identity may send the SS-PPC definitions applying the mobility management functions to other TETRA systems (the visited system, if any user A is located in the visited system). If this is done, the visited system should use the SS-PPC 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: FE25 in the visited system should not keep any SS-PPC definitions as part of the generic function tasks when delivering the SS-PPC definitions from the visited system to the home system on authorized user's behalf. This applies even if the authorized user is located in the visited system when he makes the definition, activation or deactivation.
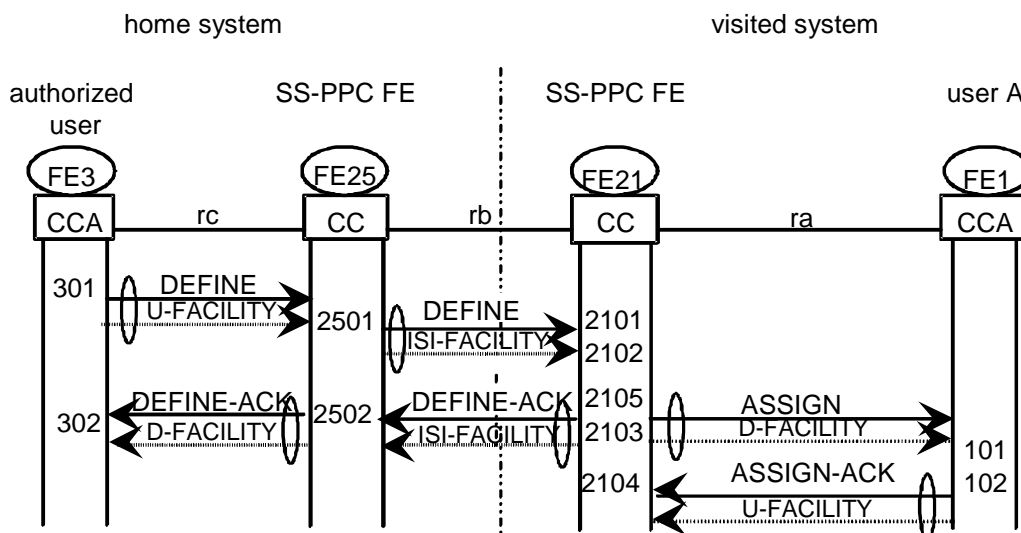
home system   visited system

authorized   SS-PPC FE   SS-PPC FE   user A
user

Figure 5: Successful definition of SS-PPC when authorized user is in visited system

5.4.1.3 Definition when user A is in visited system

Figure 6 shows the information flow sequence for definition of SS-PPC when the definition is also sent to user A. User A is in the visited system and authorized user is in the home system.

After the SS-PPC definition has been concluded, the home system of the defined subscriber identity may send the SS-PPC definitions applying the mobility management functions to other Tetra systems (the visited system, if any user A is located in the visited system). If this is done, the visited system shall use the SS-PPC 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: FE25 in the visited system should not keep any SS-PPC definitions as part of the generic function tasks when delivering an SS-PPC definition from the home system to user A, when user A is located in the visited system. If the SS-PPC definitions are updated on FE1's behalf to the visited system, the visited system should use the definitions to determine the priorities when SS-PPC is operated for services.
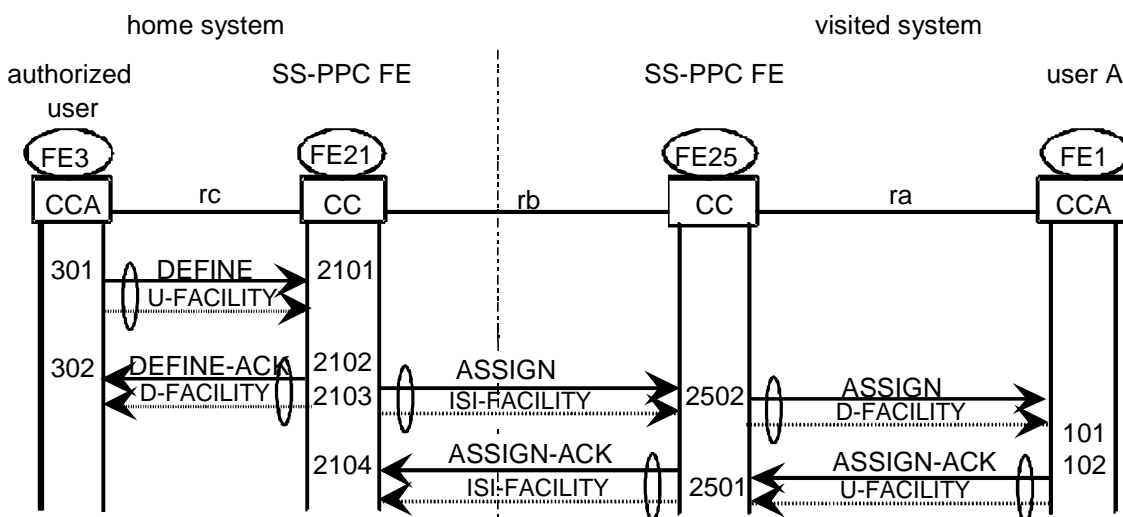
home system   visited system

authorized   SS-PPC FE   SS-PPC FE   user A
user

Figure 6: Successful definition of SS-PPC when user B is in visited system

5.4.2   Interrogation

Figure 7 shows the information flow sequence for normal operation of the SS-PPC interrogation when authorized user is in home system. If the authorized user requests the interrogation in another TETRA system, the same information flow shall appear between FE3 and FE25 over the rc relationship, but it shall also appear between FE21 and FE25 in the relationship rb.
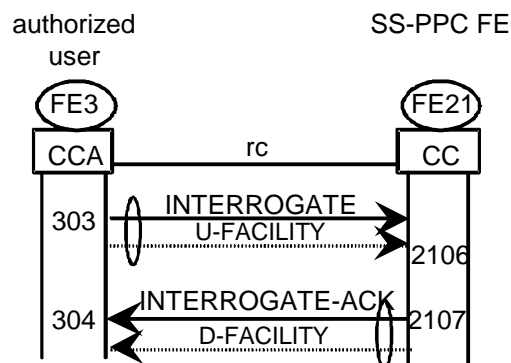
FE3 may be replaced by FE1.

Figure 7: Interrogation of SS-PPC

5.4.3   Activation

Figure 8 shows the information flow sequence for normal operation of the SS-PPC activation when authorized user is in home system. If the authorized user requests the activation in another TETRA system, the same information flow shall appear also between FE21 and FE25 in the relationship rb.
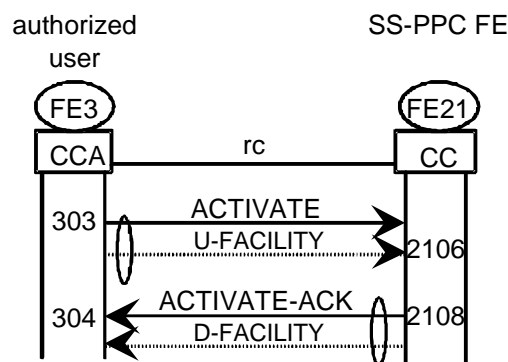
Figure 8: Activation of SS-PPC

5.4.4   Deactivation

As activation, see clause 4.2.4.4. However, the ACTIVATE and ACTIVATE-ACK information flows shall be replaced by DEACTIVATE and DEACTIVATE-ACK respectively.

5.4.5   FE actions

5.4.5.1   FE actions of FE1

101   Upon reception of an SS-PPC definition from FE21, FE1 optionally saves the definition to the database of the MS/LS, if FE1 does not find any reason for rejection.

102   If acknowledgement was requested for the definition, FE1 should send the acknowledgement. FE1 should acknowledge the definition request positively, if it finds the request valid. If not, it should return a negative acknowledgement in accordance to EN 300 392-9 [4].

5.4.5.2   FE actions of FE21

2101   Upon reception of an SS-PPC 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 accepted by FE21. If the service request failed for any reason, FE21 should return a negative acknowledgement to FE3 in accordance to EN 300 392-9 [4].

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 the 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.

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

2105   FE21 should add the routing address of FE25 to the SS-PPC information flow.

2106   Upon reception of the SS-PPC 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 in accordance to EN 300 392-9 [4].

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 EN 300 392-9 [4].

5.4.5.3   FE actions of FE3

301   Upon reception of an SS-PPC definition request from the 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   Upon reception of the definition acknowledgement, FE3 shall indicate it to the user application.

303   Upon reception of an SS-PPC 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   Upon reception of the response or the acknowledgement, FE3 shall indicate it to the user application.

5.4.5.4   FE actions of FE25

2501   FE25 should add the routing address of FE21 to the SS-PPC information flow.
2502   FE25 should locate the FE3/FE1 and send the information to it.

NOTE: FE3 may be replaced by FE1 in this action in order to reach the FE1 that has migrated into another system.

5.4.6 Operation of SS-PPC with pre-emption due to lack of resources

5.4.6.1 Operation of SS-PPC for individual call with resource pre-emption

Figure 9 shows the information flow sequence for the SS-PPC operation applied in an individual call within one TETRA system. User A invokes an individual call (on/off hook signalling) with the SS-PPC priority to user B.

The SS-PPC call causes the pre-emption of an ongoing individual call-taking place between the users Cs, i.e. resource pre-emption. Optionally, FE21 may send the impending pre-emption indication to user Cs, and shall send the pre-emption indication with the D-RELEASE information flow to user Cs.

FE21 indicates the SS-PPC priority value to user A and user B in D-CONNECT and D-SETUP information flows, respectively.
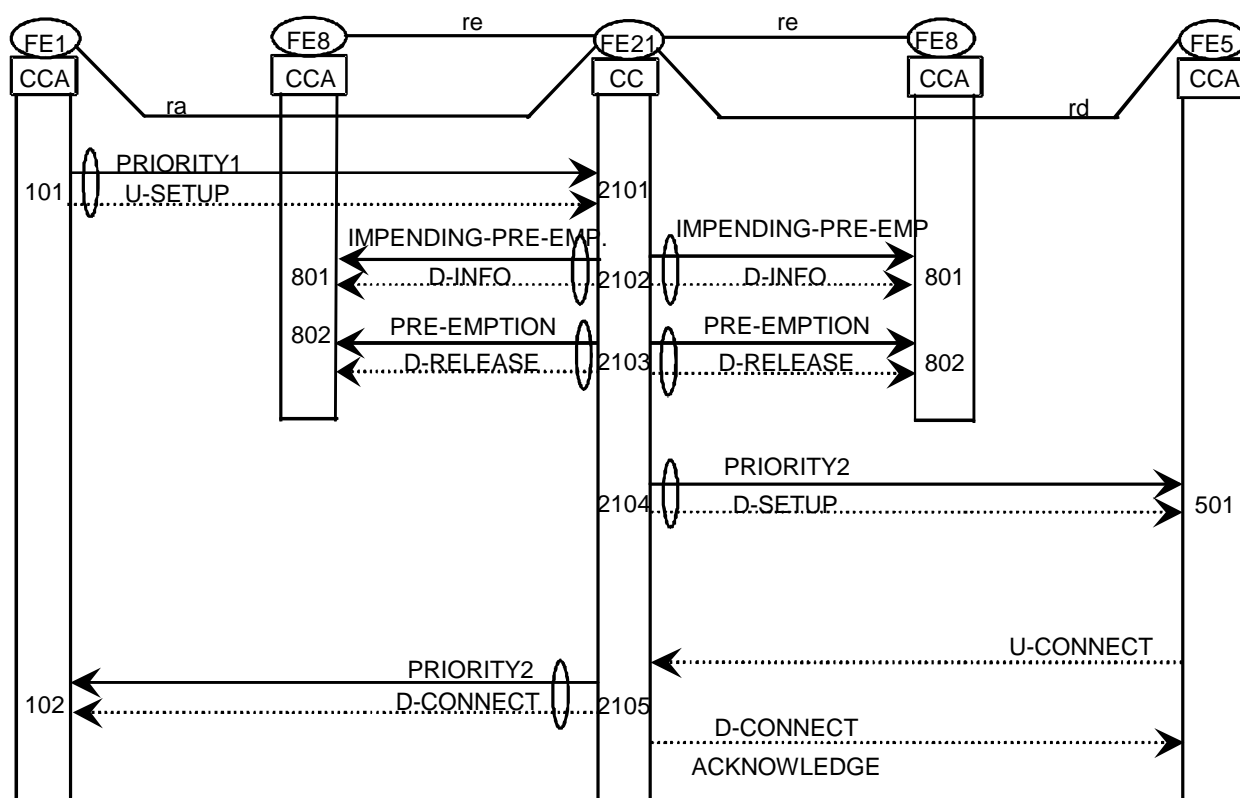

Figure 9: Operation of SS-PPC for an individual call within one TETRA system, resource pre-emption

5.4.6.2 Operation of SS-PPC for a group call with resource pre-emption

Figure 10 shows the information flow sequence for the SS-PPC operation applied in a group call within one TETRA system. User A invokes a group call with the SS-PPC priority. User B is a member of the group.

The SS-PPC call causes the pre-emption of an ongoing individual call-taking place between the users Cs, i.e. resource pre-emption. Optionally, FE21 may send the impending pre-emption indication to user Cs, and shall send the pre-emption indication with the D-RELEASE information flow to user Cs.

FE21 indicates the SS-PPC priority value to user A and user B(s) in D-CONNECT and D-SETUP information flows, respectively.
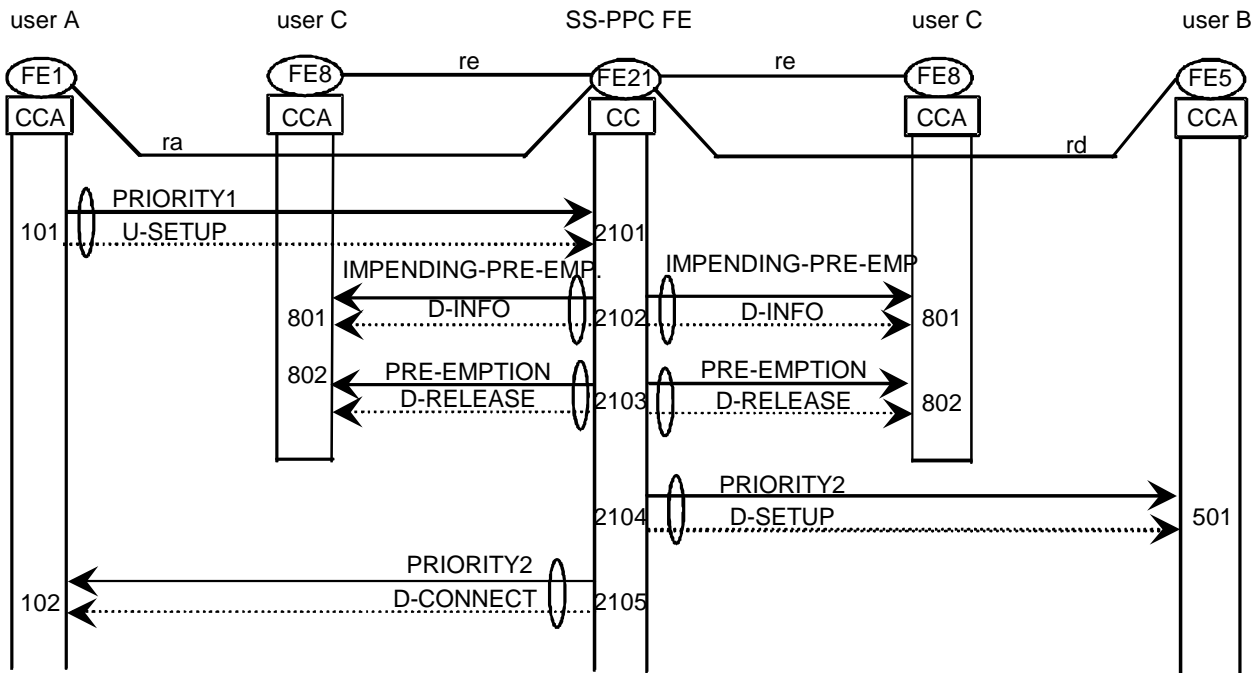
NOTE: Only one user B is shown in the figure.

Figure 10: Operation of SS-PPC for a group call within one TETRA system, resource pre-emption

5.4.6.3   Operation of SS-PPC with resource pre-emption of participants in a group call

Figure 11 shows the information flow sequence for the SS-PPC operation applied in a call. User A invokes a group call with the SS-PPC priority. User B is member of the group.

The invoked SS-PPC call causes the pre-emption of resources used by user C. User C is participating in another group call. Optionally, FE21 may send the impending pre-emption indication to user Cs, and shall send the pre-emption indication with the D-RELEASE information flow to user Cs.

FE21 indicates the SS-PPC priority value to user A and user B(s) in D-CONNECT and D-SETUP information flows, respectively.
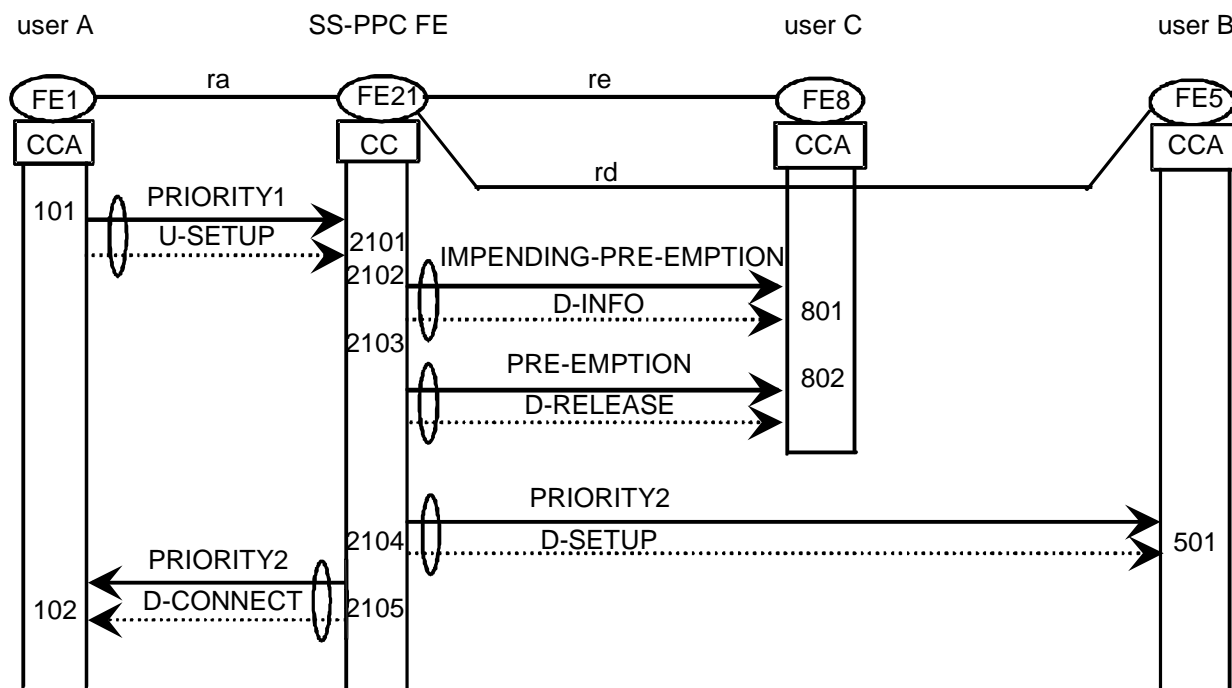

NOTE: Only one user B is shown in the figure.

Figure 11: Operation of SS-PPC for a call within one TETRA system, resource pre-emption

5.4.7   Operation of SS-PPC with a called party that is pre-empted from an ongoing call

5.4.7.1   SS-PPC call is an individual call

A called party that is engaged in a call may be pre-empted to an individual SS-PPC call by sending the SS-PPC call set-up. When the called party receives the set-up, it shall indicate the SS-PPC set-up and priority to the user application. If the user application accepts the call, the MS/LS shall follow the SS-PPC call set-up indication and complete the call set-up as indicated in EN 300 392-2 [1], clause 14. If the called party rejects the SS-PPC call, the previous call shall continue within FE5, FE21 shall terminate and clear the SS-PPC call set-up.

If the previous call was an individual call and if the called party accepts the SS-PPC call, FE21/FE25 shall ensure that the previous call is released, including the other party of the individual call. If the previous call was a group call, FE21/FE25 may send the USER-PRE-EMPTED indication to the previous call in order to indicate that the party has left the call.

The pre-empting SwMI shall inform the controlling SwMI, of cease of transmission, when the pre-empted user is transmitting during pre-emption.

Optionally, FE21/FE25 may send the impending pre-emption indication to the called party before or together with the SS-PPC call set-up, refer to clause 4.2.3.

5.4.7.2 SS-PPC call is a group call

A called party that is engaged in a call may be pre-empted to a SS-PPC group call by sending him the SS-PPC call set-up. When the called party receives the set-up, it shall indicate the SS-PPC set-up and priority to the user application.

If the previous call is an individual call and if the user moves to the SS-PPC call, the MS/LS shall follow the SS-PPC call set-up indication and complete the call set-up locally in the MS/LS as indicated in EN 300 392-2 [1], clause 14. The called party shall disconnect the previous call by sending a disconnection indication to FE21/FE25. FE21/FE25 responds to the disconnection by sending a release indication.

If the previous call was a group call, FE21 may send the USER-PRE-EMPTED indication to the previous call in order to indicate that the party has left the call. Before sending the USER-PRE-EMPTED indication, FE21 may poll the called subscriber in the previous call to find out, if he has left from the call.

If the called party does not join the SS-PPC call, he shall continue to participate in the previous call. FE21 shall complete the SS-PPC call set-up.

5.4.8 Operation for SS-PPC call initiated over ISI

Figure 12 shows the information flow sequence for the SS-PPC operation in a call initiated over the ISI. The functionality is shown for a group call in figure 12.

User A in the visited system requests the priority and FE21 in the group controlling system verifies the priority for the call. FE21 indicates the priority to user A. FE21 also indicates the priority to user B. In case of group call, there are several user B(s). However, only one user B is shown in the figure.
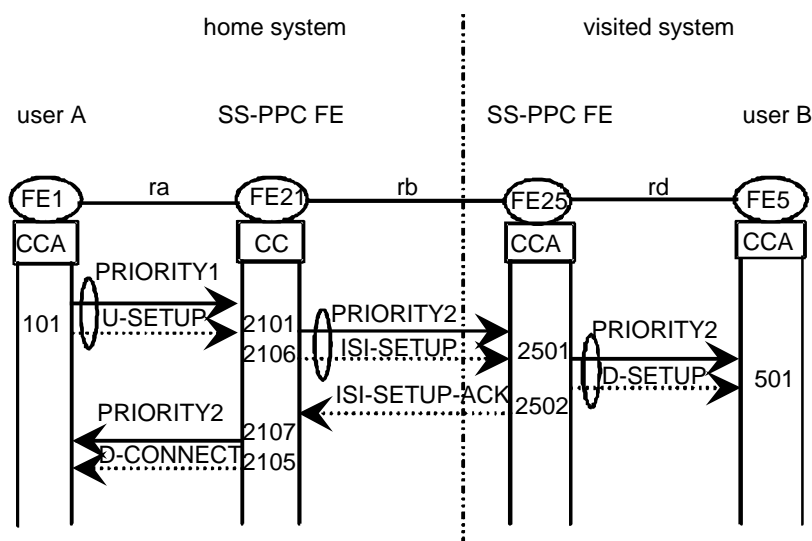
NOTE: The SS-PPC call may cause pre-emption in the home system or in the visited system or in both systems.

Figure 12: Operation of SS-PPC group call initiated over ISI, called user pre-empted

5.4.9 FE actions

5.4.9.1 FE actions of FE1

101 Upon reception of a SS-PPC invocation (requested priority level) with a service request, FE1 shall send the request to FE21. If the SS-PPC has been saved to the MS/LS unit, FE1 shall verify that the requested priority level is allowed for the service and if the level is not allowed, replace it with an allowed level.

102 Upon reception of the service invocation confirmation, FE1 shall indicate the call priority to the user application.

5.4.9.2 FE actions of FE21

2101	Upon reception of the service request including an SS-PPC invocation, FE21 shall verify and/or assign the call priority that will be applied for the service.
2102	FE21 shall send the impending pre-emption indication, if used, to the pre-empted parties, if the pre-emption is needed.
2103	FE21 shall send the pre-emption indication with service information flow to pre-empted parties.
2104	Upon reception of the service invocation, FE21 shall indicate the applied priority level to the called parties.
2105	Upon reception of the service invocation, FE21 shall confirm the SS-PPC invocation and indicate the applied priority level to the calling party.
2106	If the service extends over ISI, FE21 shall send the SS-PPC invocation with the service request to FE25 in other TETRA system.
2107	As part of the service operation over ISI, FE21 shall receive the confirmation of the invoked service.

5.4.9.3 FE actions of FE25

2501	Upon reception of the service invocation, FE25 shall indicate the applied priority level to the called parties.
2502	As part of the service operation over ISI, FE25 shall send the confirmation of the invoked service.

5.4.9.4 FE actions of FE5

501	Upon reception of the service invocation, FE5 and CCA shall receive the call priority value and shall move to the invoked call. If the called party is engaged in an ongoing call, FE5 shall compare the SS-PPC priorities of the calls, and should join the invoked call, if it has a higher SS-PPC priority. FE5 shall indicate the call priority to the user application.

5.4.9.5 FE actions of FE8

801	Upon reception of the impending pre-emption indication, FE8 shall indicate it to the user application. The impending pre-emption indication should be indicated to the user application.
802	Upon reception of the pre-emption indication, FE8 shall indicate it to the user application and act upon the received service request.

6 Allocation of FEs to physical equipment

The allocation of FEs to physical equipment is described in tables 14 and 15.

Table 14: Allocation of FEs to physical equipment during SS_PPC Management

FE/PE	SwMI	LS	MS
FE2x	+	-	-
FE3 (optional)	+	+	+
Key: + = applicable; - = not applicable.			

Table 15: Allocation of FEs to physical equipment during SS_PPC Operation

FE/PE	SwMI	LS	MS
FE1	-	+	+
FE2x	+	-	-
FE5	-	+	+
FE8	-	+	+
Key: + = applicable; - = not applicable.			

7 Interworking considerations

SS-PPC should extend to several TETRA networks over ISI, if the networks support SS-PPC. The requirements for the management part for the visited system shall be: deliver and receive SS-PPC definition information over the ISI and transfer the information to user A or authorized user.

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

Annex A (informative):
Change requests

The present document contains changes requests as presented in table A.1.

Table A.1: Change requests

No	CR vers.	Standard version	Clauses affected	Title	CR status
001	APP	Ed. 1	4.4, 5.5.12	Emergency call user pre-emption	EPT approved 040224
002	APP	Ed. 1	2, 4.2.6, 5.1.4.1.2, 5.4.7.1	Impending pre-emption presentation and other improvements	EPT approved 040326

History

Document history		
Edition 1	September 2000	Publication as ETS 300 392-11-16
V1.2.0	May 2004	One-step Approval Procedure OAP 20040917: 2004-05-19 to 2004-09-17
V1.2.1	September 2004	Publication