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Stage 2 Service Description for Personal Communications Service – Enhanced Priority Access and Channel Assignment (PACA-E) Supplementary Service

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American National Standard
for Telecommunications –

Stage 2 Service Description for Personal Communications Service – Enhanced Priority Access and Channel Assignment (PACA-E) Supplementary Service

Secretariat

Alliance for Telecommunications Industry Solutions

Approved June 7, 2000

American National Standards Institute, Inc.

Abstract

This document defines and describes the stage 2 description for the Enhanced Priority Access and Channel Assignment (PACA-E) service to support call set-up requests invoked by authorized PACA-E subscribers (access) and call completion to a PACA-E subscriber (egress). PACA-E requires modifications to basic PCS call set-up procedures in order to provide prioritization, by queuing, of the assignment of radio channel resources involved in call origination from a PACA-E subscriber (priority access) and, separately, call delivery to a PACA-E subscriber (priority egress).

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Contents

Foreword (This foreword is not part of American National Standard T1.714-2000.)

This document defines the stage 2 service description of a supplementary service, PACA-E, for Personal Communications Service (PCS) basic services such as those defined in *American National Standard for Telecommunications - Stage 1 Service Descriptions for Personal Communications Service - Circuit-Mode Bearer Services: Basic Processes*, T1.705-1995.

This service provides for the prioritization of PCS radio channel resources and is aimed at achieving a uniform, nationwide approach to the handling of priority calls.

Committee T1 recognizes that this supplementary service is intended for PCS air interfaces developed under its jurisdiction.

PACA-E, as described in this document, supersedes the PACA description in TIA IS-104.

Suggestions for improvement of this standard will be welcome. They should be sent to the Alliance for Telecommunications Industry Solutions, T1 Secretariat, 1200 G Street, NW, Suite 500, Washington DC 20005.

This standard was processed and approved for submittal to ANSI by the Accredited Standards Committee on Telecommunications, T1. Committee approval of this standard does not necessarily imply that all committee members voted for its approval. At the time it approved this standard, the T1 Committee had the following members:

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This document has been prepared by the Working Group T1P1.2 under Technical Subcommittee T1P1 of the American National Standard Institute accredited T1 Committee. Working Group T1P1.2 on Personal Communications Service Descriptions and Network Architectures has the following members:

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American National Standard
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Stage 2 Service Description for Personal Communications Service – Enhanced Priority Access and Channel Assignment (PACA-E) Supplementary Service

1   Scope, Purpose and Application

1.1   Scope and Purpose

A uniform, nationwide approach is needed to ensure effective implementation of the wireless priority treatment. This standard defines and describes call set-up procedures for the Enhanced Priority Access and Channel Assignment (PACA-E) service for priority access as well as priority egress for a Personal Communications Service (PCS) system.   This standard defines the functionality required to support the PACA-E priority treatment supplementary service in a PCS Basic Call process. This supplementary service is designed only to apply to those PCS air interfaces processed and approved by the Accredited Standards Committee on Telecommunications, T1.

This stage 2 PACA-E Service Description is limited to only call origination from a PACA-E subscriber (priority access), and separately, call delivery to a PACA-E subscriber (priority egress), as specified in T1.706, *Telecommunications - Stage 1 Service Description for Personal Communications Service - Enhanced Priority Access and Channel Assignment (PACA-E) Supplementary Service*.   End-to-End PACA-E service, including priority egress for a call originated from a PACA-E subscriber, is for further study.

1.2   Application

This service is intended to provide priority treatment to a subclass of PCS users (e.g., National Security and Emergency Preparedness [NS/EP] users) and defines a feature, which is activated by a PACA-E subscriber.   PACA-E will support up to 15 priority levels; the top five levels (1 being highest) are reserved for NS/EP users.

The remaining priority levels are offered as service provider options (e.g. emergency service calls). Emergency services call requests may be assigned a priority level in accordance with federal/state law. Coordination between PACA-E and emergency service must be maintained to provide capabilities consistent with use of the services as mandated by law.

2   Normative References

The following standards contain provisions that, through reference in this text, constitute provisions of this American National Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

T1.704-1996, *Telecommunications - Stage 2 Service Description for Personal Communications Service - Circuit-Mode Bearer Services*[1]

T1.706-1997, *Telecommunications - Stage 1 Service Description for Personal Communications Service - Enhanced Priority Access and Channel Assignment (PACA-E) Supplementary Service*[1]

T1.705-1995, *Telecommunications - Stage 1 Service Description for Personal Communications Service – Circuit-Mode Bearer Services: Basic Processes*[1]

Executive Order (E. O.) 12472, *Assignment of National Security and Emergency Preparedness Telecommunications Functions*, April 3, 1984 [2]

3   Definitions and Abbreviations

3.1   Definitions

National Security and Emergency Preparedness (NS/EP):

Executive Order (E.O.) 12472 directs the Office of the Manager, National Communications System (OMNCS) to assist in the planning for a provisioning of NS/EP communications for the Federal Government under all circumstances, through the use of commercial, government, and privately owned telecommunications resources. These communities may be classified into national security leadership, national security posture and U.S. population warning; public health, safety, and maintenance of law and order; public welfare and maintenance of the national economic posture.

3.2   Abbreviations

CCF	Call Control Function
E.O.	Executive Order
FE	Functional Entity
FEA	Functional Entity Actions
NS/EP	National Security and Emergency Preparedness
OMNCS	Office of the Manager, National Communications System
PACA-E	Enhanced Priority Access and Channel Assignment
PCS	Personal Communications Service
PMC	Personal Mobility Controller
PSTN	Public Switched Telephone Network
RACF	Radio Access Control Function
RASC	Radio Access System Controller
RCF	Radio Control Function
RPC	Radio Port Controller
RTF	Radio Terminal Function
SCF	Service Control Function
SCP	Service Control Point
SDF	Service Data Function
SSF	Service Switching Function

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[1] For electronic copies of some standards, visit ANSI's Electronic Standards Store (ESS) at www.ansi.org. For printed versions of all these standards, contact Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112-5704, (800) 854-7179.
[2] Available from the National Communications System, 701 South Court House Road, Arlington, VA 22204-2198 or http://www.ncs.gov/ncs/html/EO12472.htm.

4   PACA-E Functional Model

Figure 1 depicts the functional model to support priority access for PACA-E.
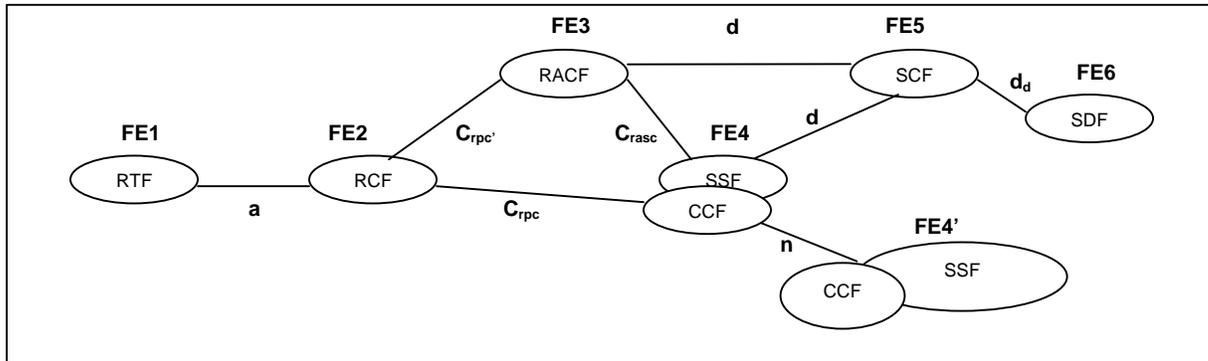

Figure 1 - PACA-E Functional Model

4.1   Radio Terminal Function (RTF) *(FE1)*

The RTF is the point from which the PACA-E subscriber accesses the network. The RTF uses the "a" reference point towards the RCF (see T1.704).

4.2   Radio Control Function (RCF) *(FE2)*

The radio control function interacts with other network functional entities (FEs) to provide the network capabilities to interact with an RTF in the processing of a PACA-E call. The RCF uses the "a" reference point towards the RTF, the "$c_{rpc'}$" reference point towards the RACF and the "c_{rpc}" reference point towards the CCF/SSF (see T1.704).

4.3   Radio Access Control Function (RACF) *(FE3)*

The radio access control function responds and provides information to service logic in the processing of PACA-E service requests. The RACF uses the "$c_{rpc'}$" reference point towards the RCF, the "c_{rasc}" reference point towards the CCF/SSF and the "d" reference point towards the SCF (see T1.704).

4.4   Call Control Function (CCF)/Service Switching Function (SSF) *(FE4)*

The CCF/SSF provides call/connection processing and control. The CCF/SSF manages the PACA-E queue. The CCF/SSF uses the "c_{rpc}" reference point towards the RCF, the "d" reference point towards the SCF, the "c_{rasc}" reference point towards the RACF and the "n" reference point towards the CCF (see T1.704).

4.5   Service Control Function (SCF) *(FE5)*/Service Data Function (SDF) *(FE6)*

The SCF commands call control functions and mobility management functions in the processing of PACA-E service requests. The SDF stores all data related to providing the PACA-E service. The SCF/SDF interacts with other FEs to obtain information required to process the PACA-E call. The SCF uses the "d" reference point towards the CCF/SSF and the RACF, and the "d_d" reference point towards the SDF (see T1.704).

4.6   Call Control Function (CCF) */Service Switching Function (SSF) (FE4')*

Incoming calls to PACA-E subscribers may need to be queued, if the PACA-E subscriber's radio facilities (i.e. no radio channels are available) have become congested. These calls arrive from remote CCF/SSFs either from wireless or non-wireless users. The CCF uses the "n" reference point towards the CCF/SSF (see T1.704).
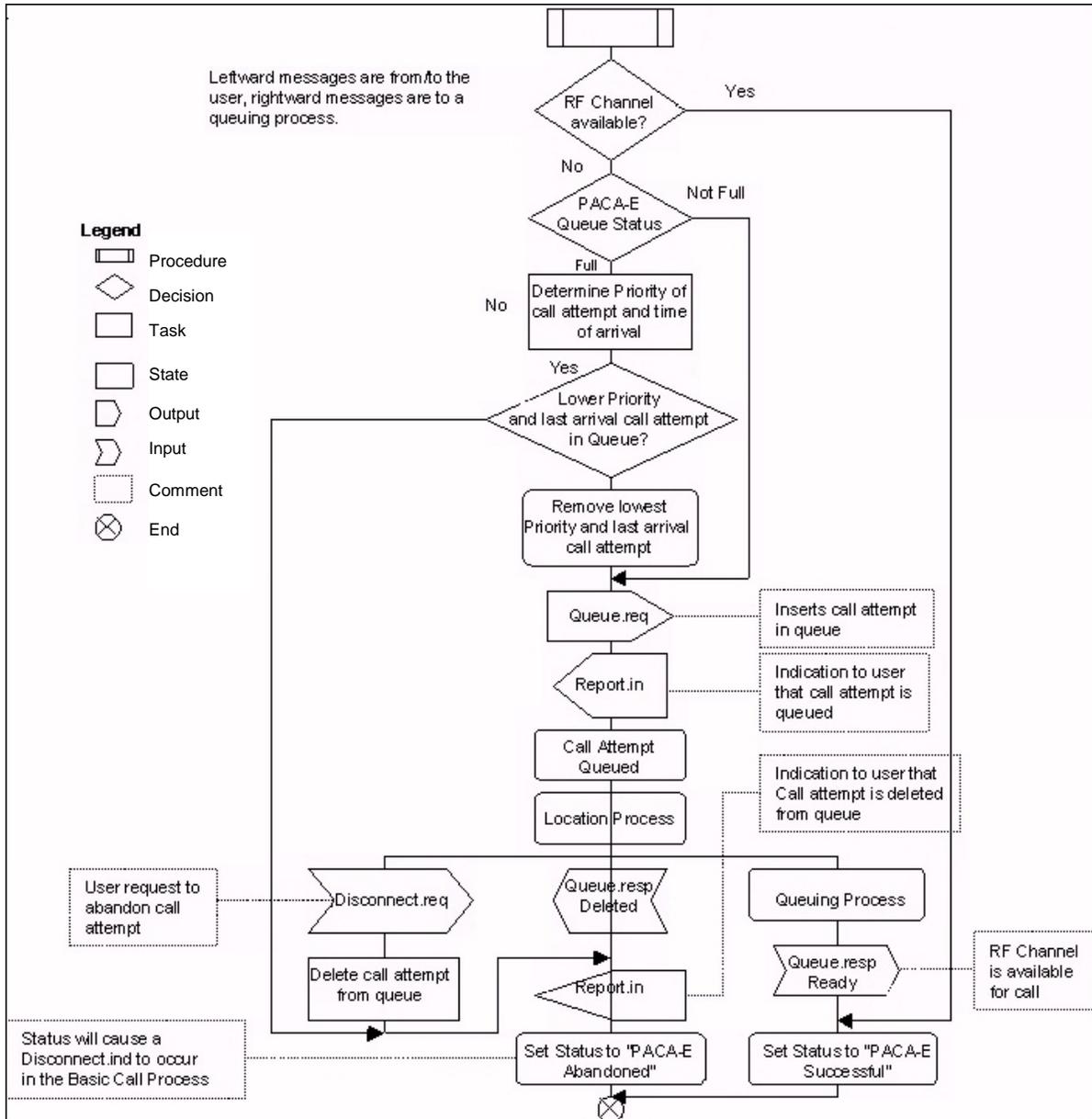
Figure 2 - PACA-E Procedure (see T1.706)

5.1   Priority Call Activation (Access/Egress)

This scenario describes the successful activation of PACA-E (access and egress) by an author-ized RTF, which has PACA-E status demand activated.
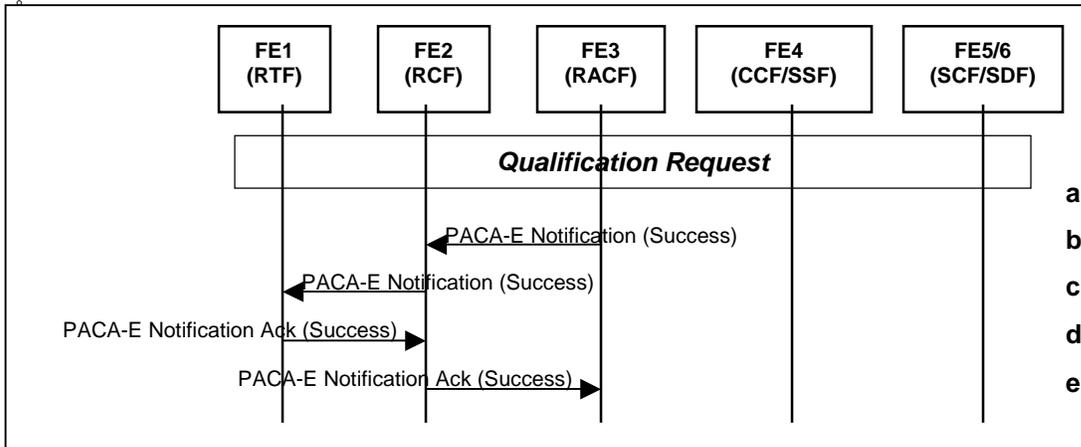

Figure 3 - Priority Call Activation (Access/Egress) Scenario

a) The RACF initiates a Qualification Request (see T1.704). For demand activation, the sub-scriber enters a feature code and sends the request (i.e., presses the SEND button), to activate the PACA-E subscription service.

> NOTE - For permanent activation, the service is activated during user registration; PACA-E subscrip-tion is included in the user's profile, so all call attempts have the PACA-E feature activated.

Activation of PACA-E Access and Egress may be performed together or separately.

b) The Serving RACF sends a PACA-E Notification (Success) Information Flow to the Visited RCF indicating that the PACA-E Activation was successful.

> NOTE - If the Activation request is unsuccessful (i.e., caller is not a PACA-E subscriber) the same message flows (steps b) – e)) occur, except the indication is set to "unsuccessful."

c) The RCF receives the PACA-E Notification (Success) Information Flow from the Serving RACF. The RCF forwards the PACA-E Notification (Success) Information Flow to the RTF, in-dicating that the PACA-E Qualification Request was successful.

d) The RTF sends a PACA-E Notification Acknowledgement (Success) Information Flow to the RCF.

e) The RCF receives the PACA-E Notification Acknowledgement (Success) Information Flow from the RTF. The RCF sends a PACA-E Notification Acknowledgement (Success) Informa-tion Flow to the RACF.

5.2 Priority Call Deactivation (Access/Egress)

This scenario describes the successful deactivation of PACA-E (access and egress) by an author-ized RTF, which has PACA-E status demand activated.
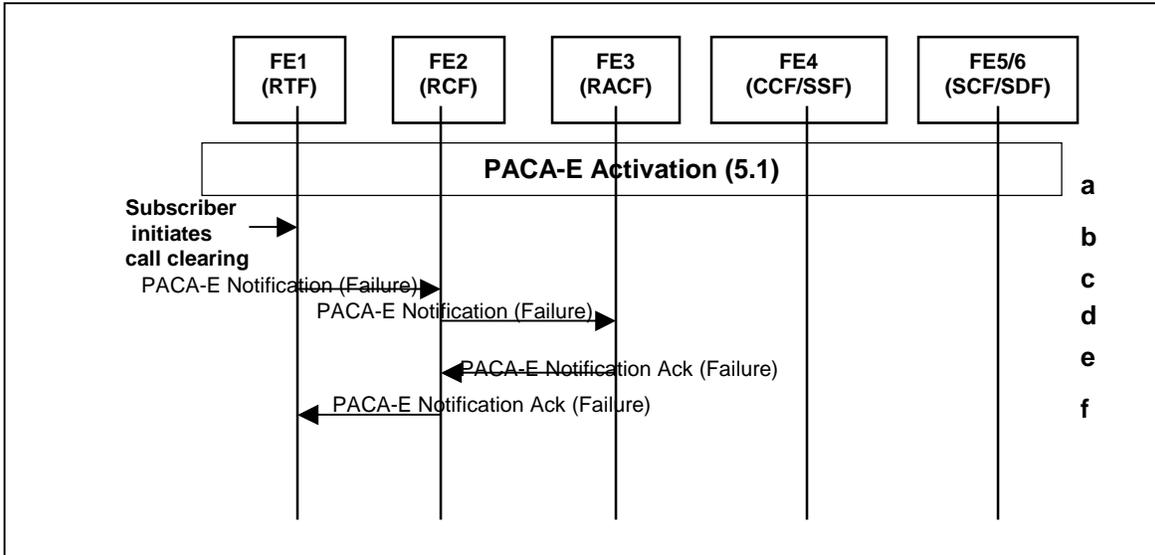

Figure 4 - Priority Call Deactivation (Access/Egress) Scenario

a) The PACA-E subscriber activates the PACA-E procedure as described in 5.1.

Deactivation of PACA-E Access and Egress may be performed together or separately.

b) After some period of time the subscriber deactivates the PACA-E service. This could be triggered when the subscriber enters a feature code or turns off the RTF.

c) The RTF sends the RCF a PACA-E Notification (Failure) Information Flow.

d) The RCF receives the PACA-E Notification (Failure) Information Flow from the RTF. The RCF forwards the PACA-E Notification (Failure) Information Flow to the RACF.

e) The RACF receives the PACA-E Notification (Failure) Information Flow from the RCF. The RACF performs any PACA-E updates and resource clearing, as necessary. The RACF sends a PACA-E Notification Acknowledgement to the RCF.

f) The RTF receives the PACA-E Notification Acknowledgement (Failure) Information Flow from the RCF. The RCF performs any PACA-E updates and resource clearing, as necessary.

6

5.3   Priority Access Call Successful Invocation/Call Completion

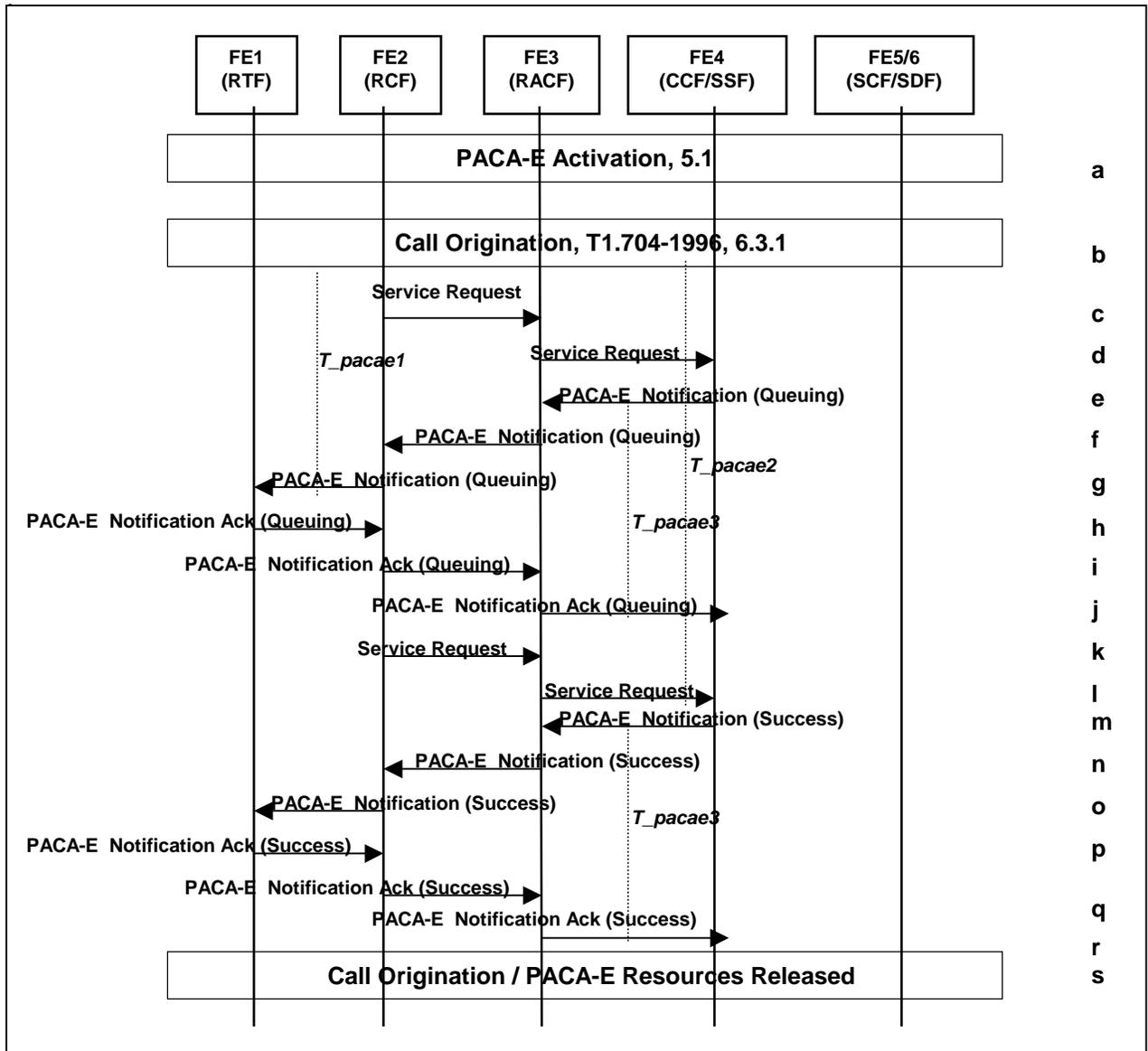This scenario describes the successful invocation of PACA-E (access) by an authorized RTF.

FE1 (RTF)	FE2 (RCF)	FE3 (RACF)	FE4 (CCF/SSF)	FE5/6 (SCF/SDF)	
PACA-E Activation, 5.1					a
Call Origination, T1.704-1996, 6.3.1					b
Service Request →					c
T_pacae1 Service Request →					d
← PACA-E Notification (Queuing)					e
← PACA-E Notification (Queuing)					f
← PACA-E Notification (Queuing) *T_pacae2*					g
PACA-E Notification Ack (Queuing) → *T_pacae3*					h
PACA-E Notification Ack (Queuing) →					i
PACA-E Notification Ack (Queuing) →					j
Service Request →					k
Service Request →					l
← PACA-E Notification (Success)					m
← PACA-E Notification (Success)					n
← PACA-E Notification (Success) *T_pacae3*					o
PACA-E Notification Ack (Success) →					p
PACA-E Notification Ack (Success) →					q
PACA-E Notification Ack (Success) →					r
Call Origination / PACA-E Resources Released					s

Figure 5 - Priority Access Call Successful Invocation/Call Completion Scenario

a) (Invocation phase begins.) For the PACA-E service to be invoked, the procedure must have been activated.

b) Having activated the PACA-E service, the subscriber attempts a call origination. Timers T_pacae1 and T_pacae2 are started.

c) During call setup, the RCF, in conjunction with the CCF/SSF, determines that there are no radio channels available. (Optional) The RCF sends a service request to the RACF with an indication that the call needs to be queued.

   NOTE - Steps c) and d) are needed if the PACA-E is maintained at the CCF/SSF.

d) (Optional) The RACF receives the service request from the RCF and forwards the service request to the CCF/SSF.

e) The CCF/SSF sends a PACA-E Notification (Queuing) Information Flow to the Serving RACF, with an indication that the call origination has been placed on the PACA-E queue. Timer T_pacae3 is started.

f) The Serving RACF sends a PACA-E Notification (Queuing) Information Flow to the Visited RCF. The Serving RACF receives a PACA-E Notification (Queuing) Information Flow from the CCS/SSF.

g) The Visited RCF receives the PACA-E Notification (Queuing) Information Flow. Timer T_pacae1 is stopped. The Visited RCF sends the RTF a PACA-E Notification (Queuing) Information Flow, which is indicated by a distinctive tone.

h) The RTF receives the PACA-E Notification (Queuing) Information Flow from the RCF. The RTF sends a PACA-E Notification Acknowledgement (Queuing) Information Flow to the RCF that the call origination has been placed on the PACA-E queue.

i) The RCF receives the PACA-E Notification Acknowledgement (Queuing) Information Flow from the RTF. The RCF forwards the PACA-E Notification Acknowledgement (Queuing) Information Flow to the RACF.

j) The RACF receives the PACA-E Notification Acknowledgement (Queuing) Information Flow from the RCF. The RACF forwards the PACA-E Notification Acknowledgement (Queuing) Information Flow to the CCF/SSF. After receiving the acknowledgement, timer T_pacae3 is stopped. (Invocation phase ends.)

k) (Call Completion phase begins.) In this scenario, when a radio channel becomes available it is assumed that this call is the highest priority and longest in queue, and therefore is next to be completed within the PACA-E queue. (Optional) The RCF notifies the RACF that a channel is available.

   NOTE - Steps k) and l) are needed if the PACA-E queue is maintained at the CCF/SSF.

l) (Optional) The RACF notifies the CCF/SSF that a radio channel is available. Timer T_pacae2 is stopped.

m)The CCF/SSF sends a PACA-E Notification (Success) Information Flow to the Serving RACF, which identifies the radio channel. Timer T_pacae3 is started.

n) The Serving RACF receives the PACA-E Notification (Success) Information Flow from the CCF/SSF. The Serving RACF sends a PACA-E Notification (Success) Information Flow to the Visited RCF.

o) The Visited RCF receives the PACA-E Notification (Success) Information Flow. The Visited RCF sends the RTF a PACA-E Notification (Success) Information Flow, which is indicated by a distinctive tone received by the caller.

p) The RTF receives the PACA-E Notification (Success) Information Flow from the RCF. The RTF sends a PACA-E Notification Acknowledgement (Success) Information Flow to the RCF.

q) The RCF receives the PACA-E Notification Acknowledgement (Success) Information Flow from the RTF. The RCF forwards the PACA-E Notification Acknowledgement (Success) Information Flow to the RACF.

r) The RACF receives the PACA-E Notification Acknowledgement (Success) Information Flow from the RCF. The RACF forwards the PACA-E Notification Acknowledgement (Success) Information Flow to the CCF/SSF. Timer T_pacae3 is stopped.

s) Call origination continues and all PACA-E resources are released. (Call completion phase ends.)

5.4   Priority Access Call Unsuccessful PACA-E Invocation

This scenario describes an unsuccessful attempt to invoke PACA-E by the RTF. This scenario occurs when the queue is full or queue resources are unavailable after the service has been activated.
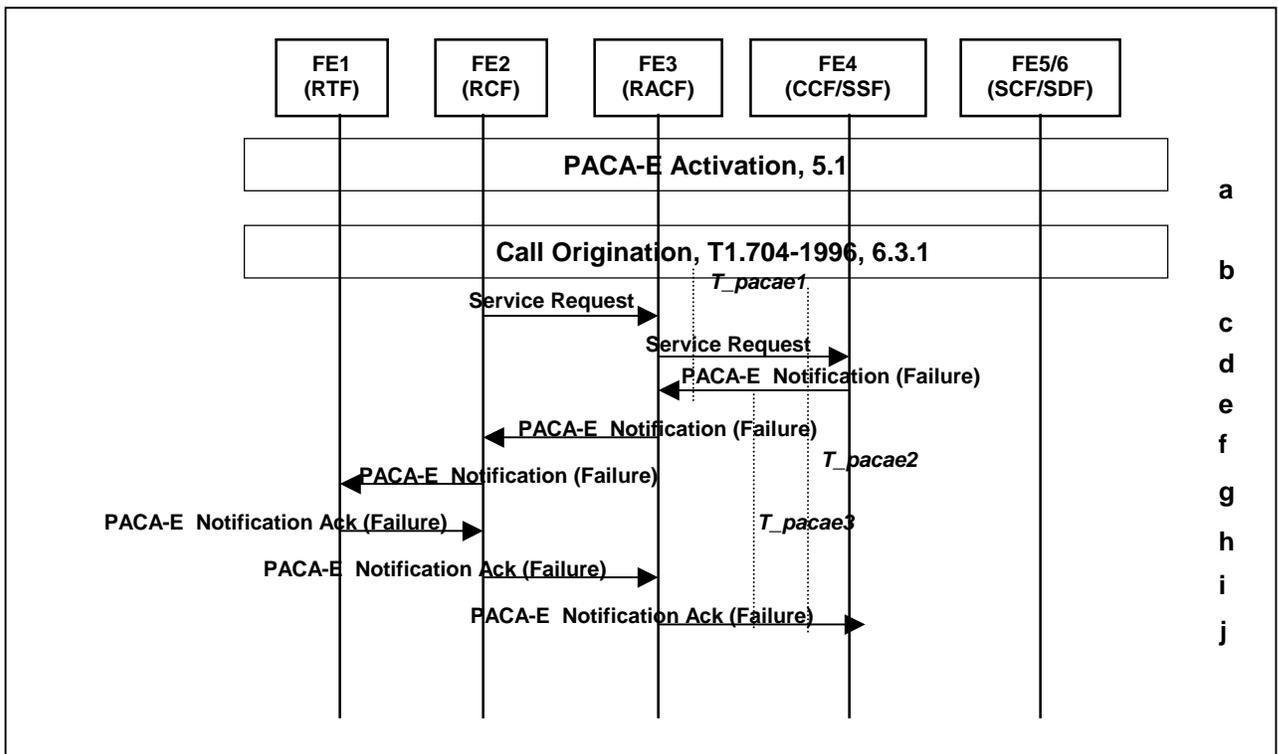

Figure 6 - Priority Access Call Unsuccessful PACA-E Invocation Scenario

a) For the PACA-E service to be invoked, the procedure must have been activated.

b) Having activated the PACA-E service, the subscriber attempts a call origination. Timers T_pacae1 and T_pacae2 are started.

c) During call setup, the RCF, in conjunction with the CCF/SSF, determines that there are no radio channels available. (Optional) The RCF sends a service request to the RACF with an indication that the call needs to be queued.

   NOTE - Steps c) and d) are needed if the PACA-E is maintained at the CCF/SSF.

d) (Optional) The RACF receives the service request from the RCF and forwards the service request to the CCF/SSF.

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e) The CCF/SSF sends a PACA-E Notification (Failure) Information Flow to the Serving RACF, with an indication that the call origination has been placed on the PACA-E queue. Timer T_pacae1 is stopped.

f) The Serving RACF sends a PACA-E Notification (Failure) Information Flow to the Visited RCF. The Serving RACF receives a PACA-E Notification (Failure) Information Flow from the CCS/SSF.

g) The Visited RCF receives the PACA-E Notification (Failure) Information Flow. Timer T_pacae1 is stopped. The Visited RCF sends the RTF a PACA-E Notification (Failure) Information Flow, which is indicated by a distinctive tone.

h) The RTF receives the PACA-E Notification (Failure) Information Flow from the RCF. The RTF sends a PACA-E Notification Acknowledgement (Failure) Information Flow to the RCF that the call origination has been placed on the PACA-E queue.

i) The RCF receives the PACA-E Notification Acknowledgement (Failure) Information Flow from the RTF. The RCF forwards the PACA-E Notification Acknowledgement (Failure) Information Flow to the RACF.

j) The RACF receives the PACA-E Notification Acknowledgement (Failure) Information Flow from the RCF. The RACF forwards the PACA-E Notification Acknowledgement (Failure) Information Flow to the CCF/SSF. After receiving the acknowledgement, timers T_pacae2 and T_pacae3 are stopped.

5.5   PACA-E Failure While Call is Queued

This scenario describes a queued call failure. This scenario occurs if the network needs to re-move the call from the PACA-E queue (i.e., time has expired, the call cannot be located, or a higher priority call enters the queue and bumps this call out of the queue).
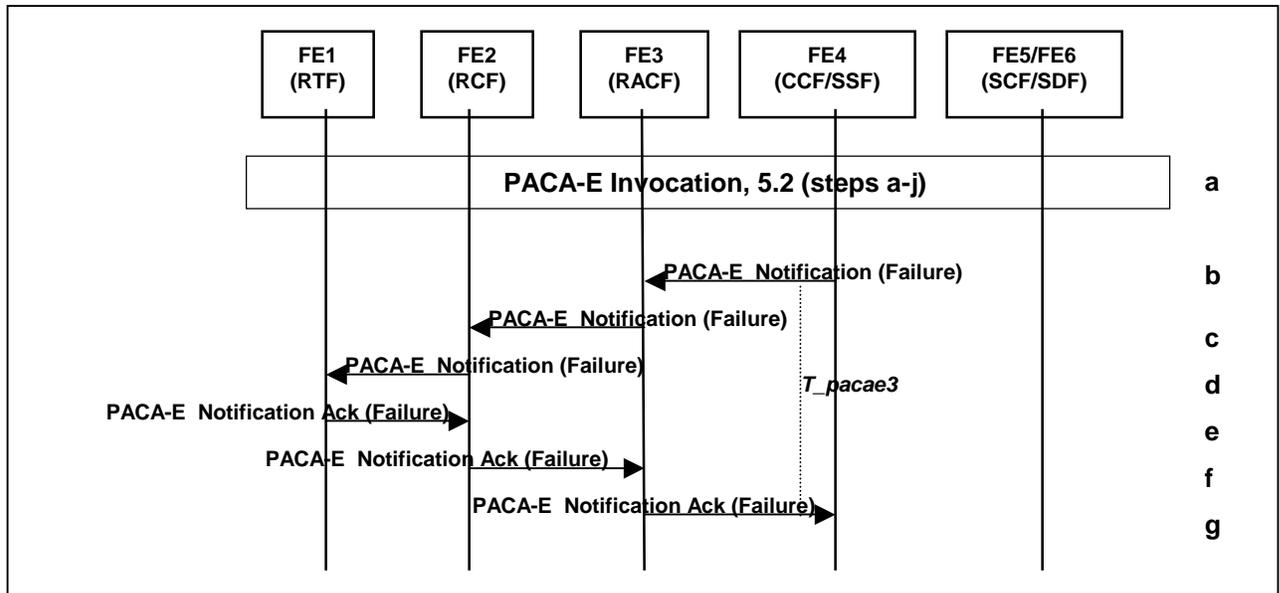

Figure 7 - PACA-E Failure While Call is Queued Scenario

a)   PACA-E call is queued, based on PACA-E Invocation (5.3).

b)   After some period of time, the network determines that the call needs to be removed from the PACA-E queue. The CCF/SSF sends a PACA-E Notification (Failure) Information Flow to the RACF indicating the request has failed. T_pacae3 is started.

c)   The RACF receives the PACA-E Notification (Failure) Information Flow from the CCF/SSF and forwards the PACA-E Notification (Failure) Information Flow to the RCF.

d)   The RCF receives the PACA-E Notification Information Flow from the RACF and forwards the PACA-E Notification (Failure) Information Flow to the RTF.

e)   The RTF sends a PACA-E Notification Acknowledgement (Failure) Information Flow. The RTF notifies the subscriber that the call has been removed from the queue.

f)   The RCF receives the PACA-E Notification Acknowledgement (Failure) Information Flow from the RTF and forwards the PACA-E Notification Acknowledgement (Failure) Information Flow to the RACF.

g)   The RACF receives the PACA-E Notification Acknowledgement (Failure) Information Flow from the CCF/SSF. Upon receiving the acknowledgement, the CCF/SSF and the RACF re-lease all PACA-E related resources. T_pacae3 is stopped.

5.6 Priority Access Call Queue Position Update

This scenario describes the queued call origination status being updated to the subscriber.
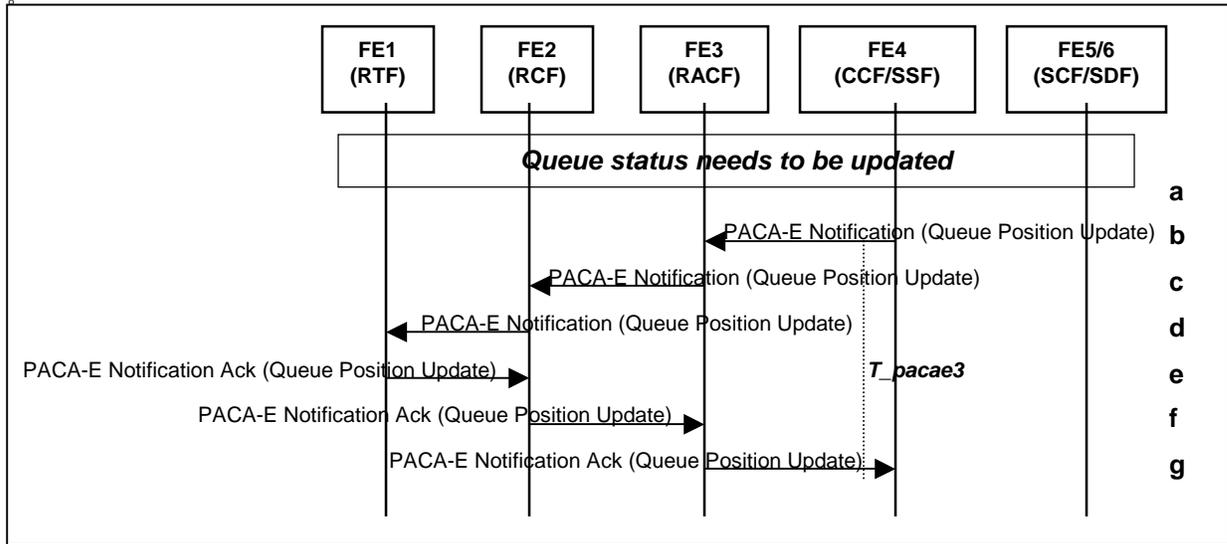

Figure 8 - Priority Access Call Queue Position Update Scenario

a) The PACA-E priority access user may receive an indication of the PACA-E queuing request status (i.e., a fixed time has elapsed since the last update).

b) The CCF/SSF sends a PACA-E Notification (Queue Position Update) Information Flow to the RACF. Timer T_pacae3 is started.

c) The RACF receives the PACA-E Notification (Queue Position Update) Information Flow from the CCF/SSF. The RACF sends a PACA-E Notification (Queue Position Update) Information Flow to the RCF.

d) The RCF receives the PACA-E Notification (Queue Position Update) Information Flow from the RACF. The RCF sends a PACA-E Notification (Queue Position Update) Information Flow to the RTF.

e) The RTF receives the PACA-E Notification (Queue Position Update) Information Flow from the RCF. The RTF sends a PACA-E Notification Acknowledgement (Queue Position Update) Information Flow to the RCF.

f) The RCF receives the PACA-E Notification Acknowledgement (Queue Position Update) Information Flow from the RTF. The RCF sends a PACA-E Notification Acknowledgement (Queue Position Update) Information Flow to the Serving RACF.

g) The Serving RACF receives the PACA-E Notification Acknowledgement (Queue Position Update) Information Flow from the RCF. The Serving RACF forwards the PACA-E Notification Acknowledgement (Queue Position Update) Information Flow to the CCF/SSF. Timer T_pacae3 is stopped.

5.7 Idle Hand-off with PACA-E Invoked

This scenario describes the hand-off of a PACA-E queued call between the base stations (RCFs) of an MSC (CCF/SSF).
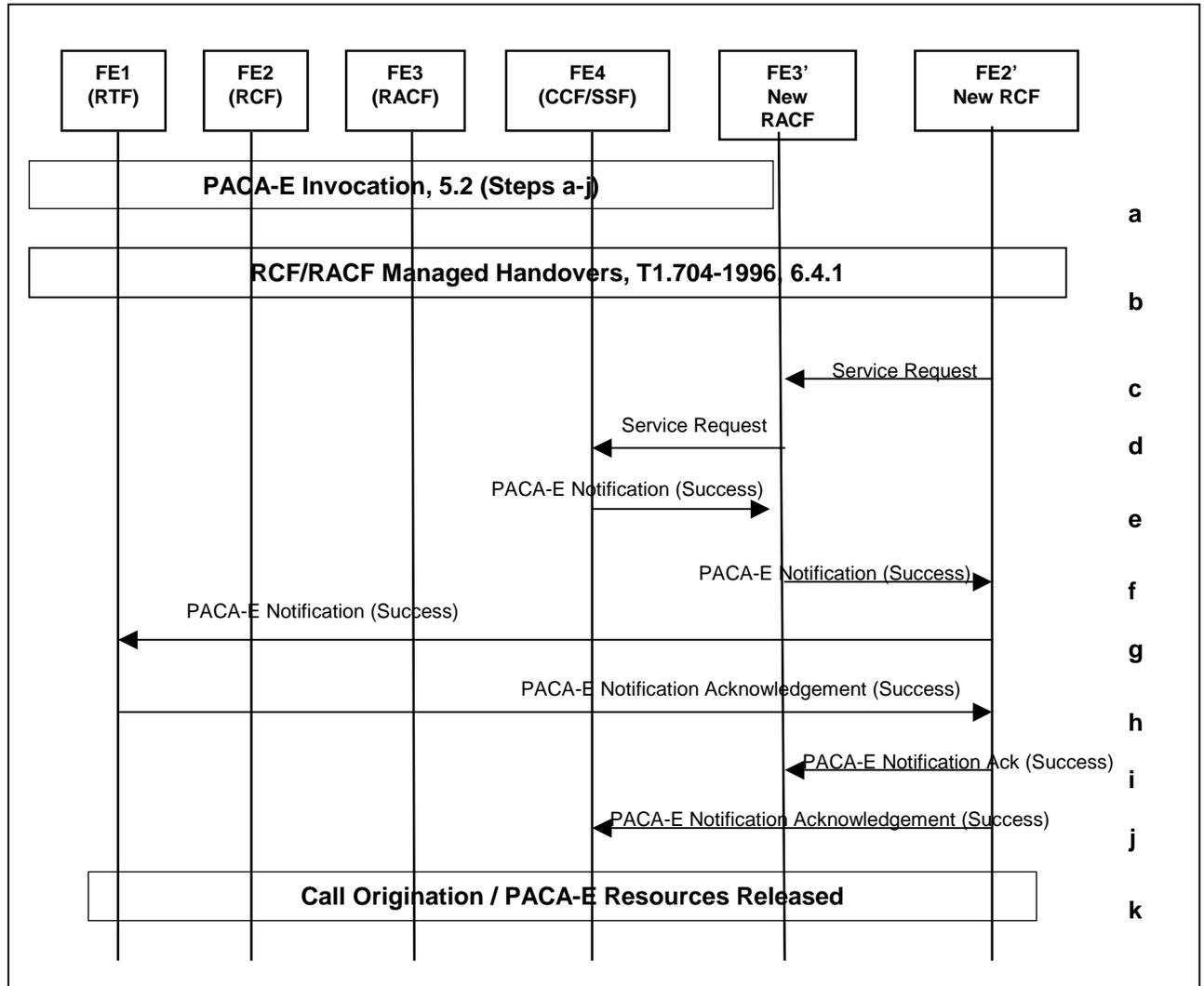

Figure 9 - Idle Hand-off with PACA-E Invoked Scenario

a) For idle hand-off to occur, the PACA-E feature must have been invoked and a PACA-E call must have been queued.

b) The network determines that the queued call needs to be handed-off to another RCF/RACF and follows the procedures outlined in Executive Order (E.O.) 12472. If a radio channel is available, call origination should continue; however, if the new RCF/RACF is congested (i.e., no channel available), the call should be placed in the queue based on its priority level and time-stamp.

c) (Optional) The New RCF notifies the New RACF that a channel is available.

NOTE - Steps c) and d) are needed if the PACA-E queue is maintained at the CCF/SSF.

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d) (Optional) The New RACF receives the notification that a channel is available from the New RCF and forwards the Service Request to the CCF/SSF.

e) The CCF/SSF sends a PACA-E Notification (Success) Information Flow to the New Serving RACF, with a "Success" indication.

f) The New Serving RACF forwards the PACA-E Notification (Success) Information Flow to the New RCF.

g) The New Serving RCF sends a PACA-E Notification (Success) Information Flow to the RTF. The RTF will need to re-originate the call.

h) The RTF sends a PACA-E Notification (Success) Acknowledgement to the New Serving RCF.

i) The New Serving RCF receives the PACA-E Notification Acknowledgement (Success) Information Flow from the RTF and forwards it to the New Serving RACF.

j) The New Serving RACF receives the PACA-E Notification Acknowledgement (Success) Information Flow from the RCF and forwards it to the CCF/SSF.

k) The call is re-originated and all PACA-E related resources are released.

5.8 Priority Egress Call Delivery Processing

This scenario describes the successful call delivery processing to support PACA-E (egress) to an authorized RTF, which has PACA-E activated.
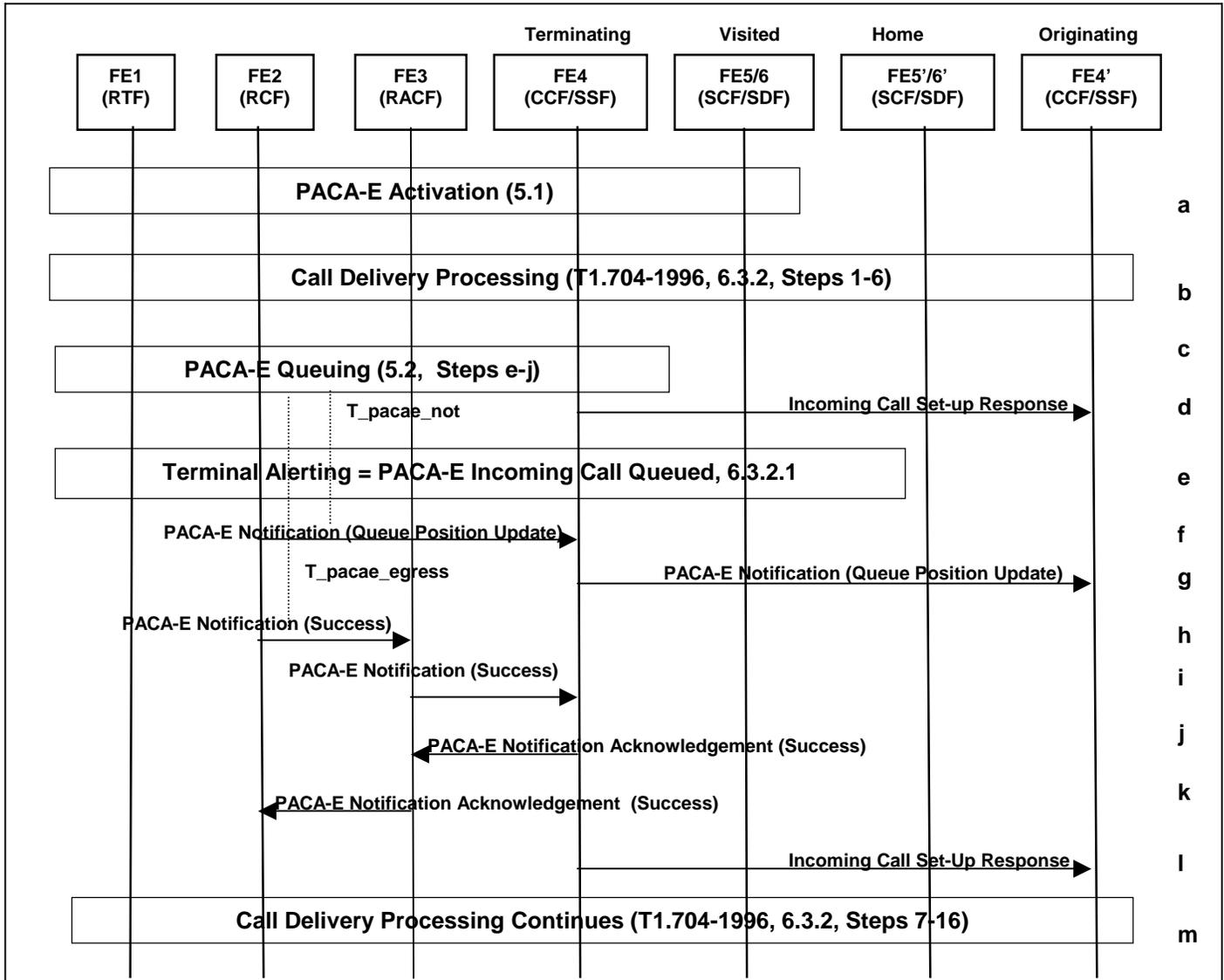

Figure 10 - Call Delivery Processing (Egress) Scenario

a) The PACA-E subscriber activates the PACA-E service as described in 5.1.

b) While the RTF is idle, a call delivery request arrives and the Call Delivery Process (T1.704, 6.3.2) is performed, steps 1-6.

c) At step 6 (T1.704, 6.3.2), the CCF/SSF-Destination discovers that there is no bearer channel available and the destination subscriber has the PACA-E service activated. The RCF/RACF places the call in queue and timers T_pacae_not (optional, used to time periodic updates to caller) and T_pacae_egress (used for call clearing) are started. The subscriber and caller are marked busy to subsequent call.

d) The CCF/SSF-Destination notifies the CCF/SSF-Originating that the call has been queued. The caller is notified that the call has been queued, either by voice announcement or signal.

e) The Terminating Network notifies the subscriber that there is an incoming call that has been queued (using the Terminal Alerting Procedure described in T1.704, 6.3.2.1).

f) (Optional) Periodically, when T_pacae_not timer expires, the RCF provides queue information to the CCF/SSF-Destination and resets the timer.

g) (Optional) The CCF/SSF-Destination notifies the CCF/SSF-Originating of the queue status and queue position. The caller may receive this update information through a voice announcement or signal.

h) After some period of time, a channel becomes available. Optional (if queue is maintained at RCF), the RCF notifies the RACF that a channel is available.

> NOTE - If the network needs to remove the call from the queue, steps h) – l) would be followed; however the "Failure" signal would be sent. Failure occurs if a higher priority caller enters the queue and bumps this call, the call times out of the queue (timer T_pacae_egress is stopped), or either of the parties is no longer able to be located by the network.

i) (Optional) The RACF notifies the CCF/SSF-Destination that a radio channel has become available.

j) The CCF/SSF-Destination receives the PACA-E Notification Information Flow (Success) and replies to the RACF with a PACA-E Notification Acknowledgement (Success) Information Flow.

k) The RACF receives the PACA-E Notification Acknowledgement (Success) Information Flow and forwards it onto the RACF.

l) The CCF/SSF-D notifies the CCF/SSF-O that the radio channel has become available.

m) The Call Delivery Process continues from step 7 (see T1.704, 6.3.2), or optionally, is repeated from step 1. All PACA-E related resources are released.

5.9   Priority Egress Call Clearing Initiated by the Caller

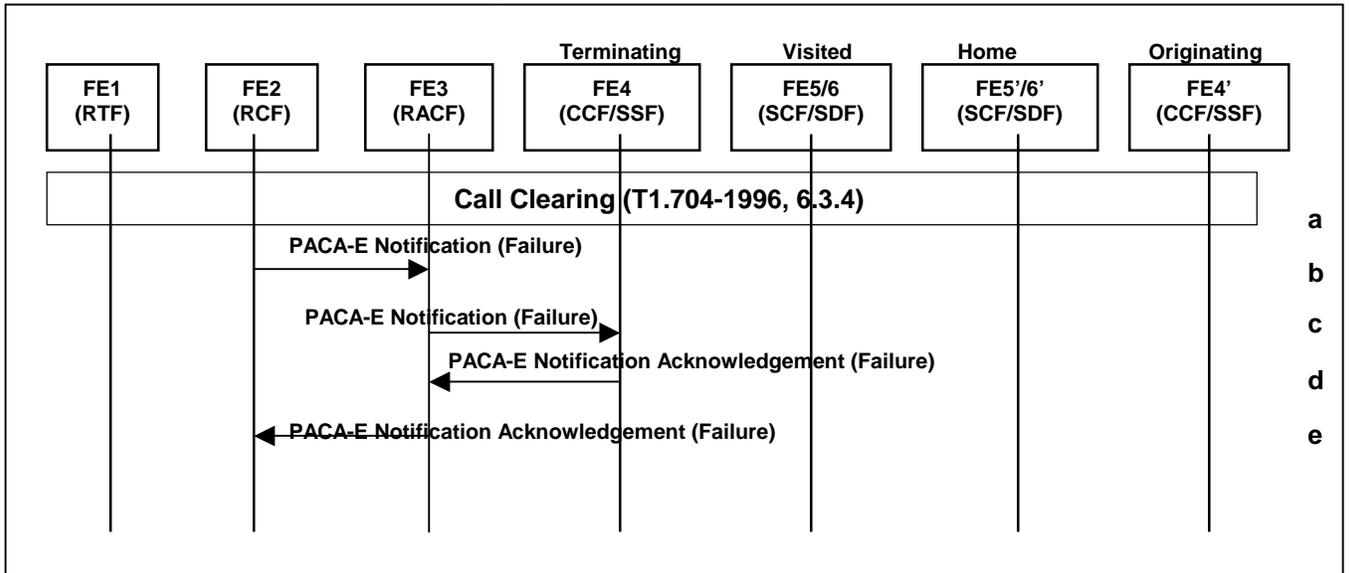This scenario describes a caller canceling a PACA-E queued call.

Figure 11 - Priority Egress Call Clearing Initiated by the Caller

a) The originating caller or the network initiates call clearing and the network performs the Call Clearing procedure described in T1.704.

b) After the call has been cleared, the network needs to release any PACA-E related re-sources. The RCF sends a PACA-E Notification (Failure) Information Flow to the RACF.

c) The RACF receives the PACA-E Notification (Failure) Information Flow and forwards it to the CCF/SSF-Terminating.

d) The CCF/SSF-Terminating receives the PACA-E Notification (Failure) Information Flow and clears any PACA-E related resources. The CCF/SSF-Destination returns a PACA-E Notifica-tion Acknowledgement (Failure) Information Flow to the RACF.

e) The RACF receive the PACA-E Notification (Failure) Response Information Flow from the CCF/SSF-Terminating and forwards it to the RCF. The RCF clears any PACA-E related re-sources.

5.10   Priority Egress Call Clearing Initiated by the PACA-E Subscriber

This scenario describes Call Clearing initiated by the PACA-E subscriber. This scenario could be triggered if the Subscriber turns off the phone or initiates a PACA-E access call.
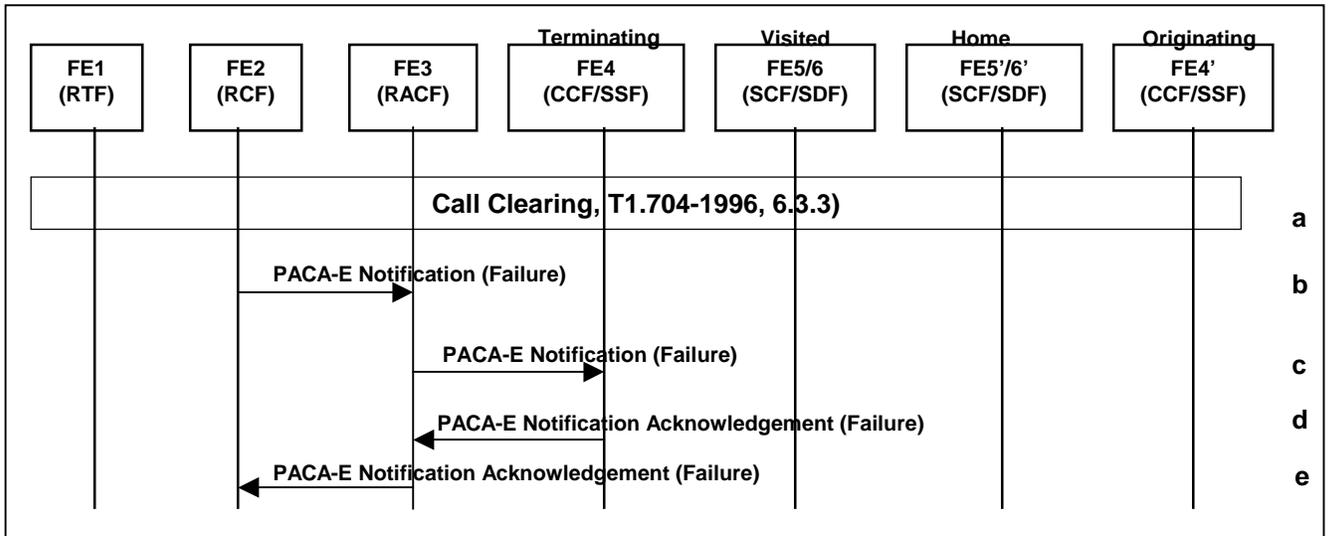

Figure 12 - Priority Egress Call Clearing Initiated by the PACA-E Subscriber

a) The PACA-E subscriber initiates call clearing and the network performs the Call Clearing procedure described in T1.704.

b) After the call has been cleared, the network needs to release any PACA-E related re-sources. The RCF sends a PACA-E Notification (Failure) Information Flow to the RACF.

c) The RACF receives the PACA-E Notification (Failure) Information Flow and forwards it to the CCF/SSF-Terminating.

d) The CCF/SSF-Terminating receives the PACA-E Notification (Failure) Information Flow and clears any PACA-E related resources. The CCF/SSF-Terminating returns a PACA-E Notification (Failure) Response Information Flow to the RACF.

e) The RACF receives the PACA-E Notification (Failure) Response Information Flow from the CCF/SSF-Terminating and forwards it to the RCF. The RCF clears any PACA-E related re-sources.

5.11   PACA-E Feature Interrogation

This optional scenario describes the PACA-E subscriber interrogating the system concerning the status of the feature.
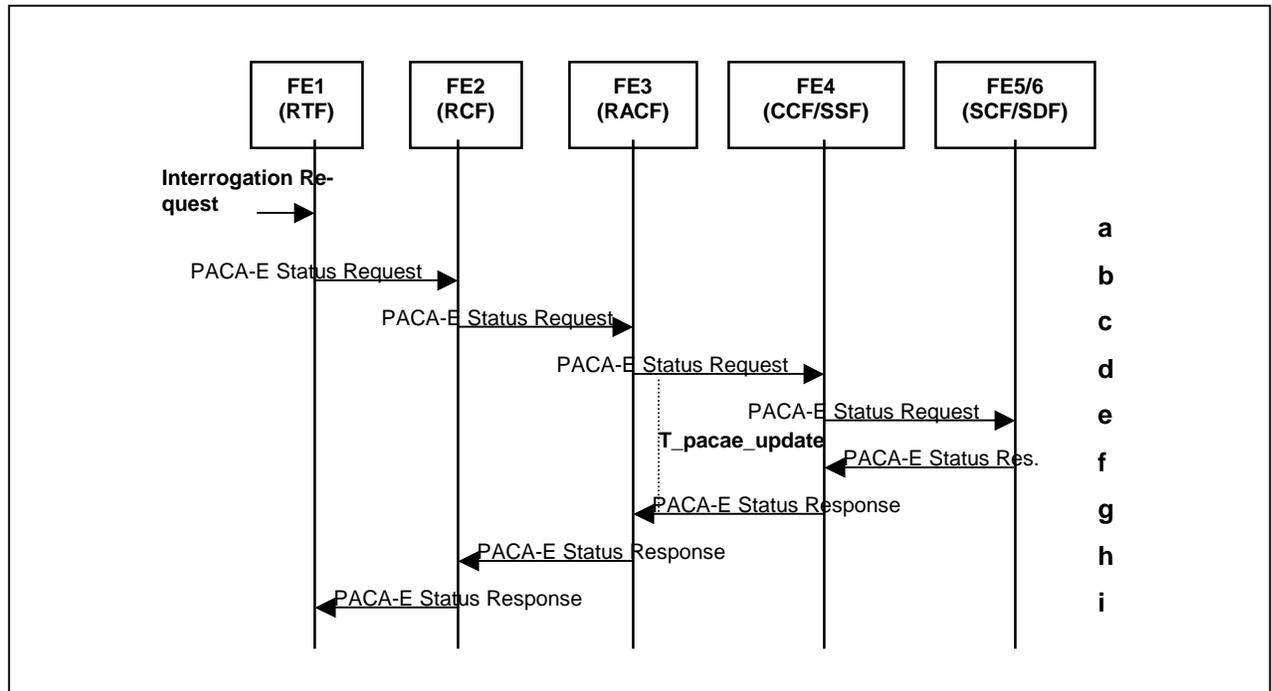

Figure 13 - PACA-E Feature Interrogation Scenario

a) The PCS subscriber may, by an appropriate control procedure, request the subscription status of PACA-E from the network (see T1.704).

b) The RTF sends a PACA-E Status Request Information Flow to the RCF.

c) The RCF receives the PACA-E Status Request Information Flow from the RTF. The RCF sends a PACA-E status Information Flow to the RACF.

d) The RACF receives the PACA-E Status Request Information Flow. The RACF forwards the PACA-E Status Information Flow to the CCF/SSF. Timer T_pacae_update is started.

e) The CCF/SSF receives the PACA-E Status Request Information Flow and queries the PACA-E status from the SCF/SDF.

f) The SCF/SDF receives the PACA-E Status Request Information Flow from the CCF/SDF.

   NOTE - The SCF/SDF may need to query the Home SCF/SDF. The SCF/SDF determines the PACA-E status and returns a PACA-E Status Response Information Flow to the CCF/SSF.

g) The CCF/SSF receives the PACA-E Status Response Information Flow from the SCF/SDF and forwards the PACA-E Status Response Information Flow to the RACF. Timer T_pacae_update is stopped.

h) The RACF receives the PACA-E Status Response Information Flow from the CCF/SSF. The RACF forwards the PACA-E Status Response Information Flow to the RCF.

i) The RCF receives the PACA-E Status Response Information Flow from the RACF. The RCF forwards the PACA-E Status Response Information Flow to the RTF.

6   Queue Management

6.1   Queue Contention

There may arise a situation where there are no radio resources available and a PACA-E access and a PACA-E egress call arrive at the same time. When this situation arises, the PACA-E egress call should be placed in the PACA-E queue ahead of the PACA-E access call.

6.2   Hand-off

6.2.1   Intrasystem Hand-off

A subscriber shall be able to roam between the cells of a system while a PACA-E request is pending and not lose his or her place in the queue to PACA-E requests of the same or lower priority that were received later.

6.2.2   Intersystem Hand-off

Roaming between systems while a PACA-E request is pending is for further study.

6.3   PACA-E Timers

The following timers are used in clause 5. The following table defines each timer and suggests a range and default value to be used.

Table 1 - PACA-E Timers

Timer	Use	Range (sec)	Default Value (sec.)
T_pacae1	Used to time the response of a Call Origination Attempt.	1-10 sec.	5 sec.
T_pacae2	Serves as Location Timer until a Call Origination Attempt is completed or cancelled.	1-100 sec.	50 sec.
T_pacae3	Used to time the acknowledgement of a PACA-E Notification signal.	1-10 sec.	5 sec.
T_pacae_update	Used to time an interrogation request.	1-10 sec.	5 sec.
T_pacae_not	Used to time updates for egress calls in queue, as they progress over time.	1-300 sec.	150 sec.
T_pacae_egress	Used to time egress calls in queue for queue clearing.	1-300 sec.	30 sec.

6.4   Size

The size of the PACA-E queue is dynamically allocated based on the number of access and egress subscribers that have subscribed to the PACA-E supplementary service within a given serving area.

6.5   Time Stamp Management

For this standard, it is assumed that management of a PACA-E timestamp is maintained by the CCF/SSF. The specifics concerning the timestamp will be addressed in stage 3 and are for further study.

7   Capabilities for Charging

It shall be possible for the PCS service provider to charge separately for the individual PACA-E access and egress capabilities as well as for the complete PACA-E service (access and egress). The mechanisms to support charging are beyond the scope of this document (see T1.706).

Annex A
(informative)

PACA-E Signals

This clause describes the PACA-E signals defined in clause 5 and describes a possible implementation within the existing air interface standards.

PACA-E Notification -   This information flow is used to communicate information about the PACA-E call. This information flow may require an acknowledgement from the RTF.

    Queuing -   This status is sent by the CCF/SSF to the RTF to indicate that the call has been successfully queued.

    Success -   This status is sent by the CCF/SSF to the RTF to indicate that the Supplementary Service has been successfully activated or that a radio channel is available for the call to access.

    Failure -   This status is sent by the CCF/SSF to the RTF to indicate that the PACA-E call has been cancelled.

    Position Update -   This status is sent by the CCF/SSF to the RTF to indicate the user's position within the queue.

Table A.1 - PACA-E Notification Representation

Message	Standard
PACAIndicator	IS-41
PACA Message / PACA Cancel	CDMA (IS-95B)
Queue Update / Queue Disconnect	TDMA (IS-136)
PACA Message / PACA Cancel	IS-634 (BS-MSC, "A" Interface)
None Defined	GSM

PACA-E Status Request -   This information flow is used to communicate subscription status from the network including whether the subscriber is authorized for PACA-E Access, Egress, or both, permanent or demand activation, and possibly the highest priority level available to subscriber.   The PACA-E Status Request signal has a corresponding acknowledgement signal.

Table A.2 - PACA-E Notification Representation

Message	Standard
PACAIndicator	IS-41
PACA Command	CDMA (IS-95B)
Queue Update	TDMA (IS-136)
PACA Command	IS-634 (BS-MSC, "A" Interface)
None Defined	GSM