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Foreword

This ETSI Technical Report (ETR) has been produced by the Network Aspects (NA) Technical Committee of the European Telecommunications Standards Institute (ETSI).

ETSI Technical Reports (ETRs) are informative documents resulting from ETSI studies which are not appropriate for European Telecommunication Standard (ETS) or Interim-European Telecommunication Standard (I-ETS) status. An ETR may be used to publish material which is either of an informative nature, relating to the use or application of ETSs or I-ETSs, or which is immature and not yet suitable for formal adoption as an ETS or I-ETS.

This ETR gives a general description of the various Universal Personal Telecommunication (UPT) procedures and the related states of the UPT user. It describes the UPT procedures as seen from the UPT user or any other user in terms of possible interactions with the UPT service.

This ETR consists of 11 parts as follows:

- Part 1: "Principles and objectives";
- Part 2: "General service description";
- Part 3: "Service aspects of charging, billing and accounting";
- Part 4: "Service requirements on security mechanisms";
- Part 5: "UPT terminals and UPT access devices";
- Part 6: "UPT subscription and service profile";
- Part 7: "User procedures and user states";**
- Part 8: "Man-machine interface aspects";
- Part 9: "Service requirements on numbering, addressing and identification";
- Part 10: "Supplementary services";
- Part 11: "Service requirements on protection of third parties".

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1 Scope

This ETSI Technical Report (ETR) describes the Universal Personal Telecommunication (UPT) user procedures that are added or modified compared to Phase 1 (ETR 217 [1]) in order to support the new UPT features of Phase 2.

This ETR gives a general description of the various UPT procedures and the related states of the UPT user. It describes the UPT procedures as seen from the UPT user or any other user in terms of possible interactions with the UPT service. No restrictions in terms of network implementation or man-machine interface are included. Such requirements are given in other technical specifications.

2 References

This ETR incorporates by dated and undated reference, provisions from other publications. These references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETR only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] ETR 217: "Universal Personal Telecommunication (UPT); Phase 1 (restricted UPT service scenario); User procedures and user states".
- [2] ETS 300 391-1: "Universal Personal Telecommunication (UPT); Specification of the security architecture for UPT phase 1; Part 1: Specification".

3 UPT procedures

The following basic categories of UPT procedures exist:

- a) personal mobility procedures;
- b) UPT call handling procedures;
- c) UPT service profile management procedures;
- d) procedures for the support of UPT supplementary services.

Each of these basic UPT procedures may involve some **elementary procedures**, which therefore are described separately. In addition, a set of **exceptional procedures** may exist for use in exceptional cases. All the UPT procedures are described in the following.

In all UPT procedures, some information will have to be supplied by the UPT user, some of which is mandatory and some is optional. All optional information may be included in the UPT user's service profile as default parameters, or may be supplied on a case-by-case basis.

3.1 Elementary procedures

Elementary procedures are procedures that have no significance on their own. These procedures are always carried out in connection with one of the basic UPT procedures, either before, or as part of, such a procedure, if required. The following are the elementary procedures defined for UPT:

- access;
- identification;
- authentication;
- global follow-on;
- OutCall follow-on.

All elementary procedures are included in Phase 1 of UPT and therefore are not described further in this ETR.

3.2 Personal mobility procedures

Personal mobility procedures are UPT procedures relating to the personal, or discrete, mobility of the UPT user, used in order to ensure that the UPT user is able to receive or make UPT calls. The personal mobility procedures do not involve, however, actual making or receiving of calls.

3.2.1 Essential procedures

3.2.1.1 InCall registration

The basic procedure was included in Phase 1. The following changes and additions are included in Phase 2:

- an InCall registration may be carried out as part of an AllCall registration procedure;
- the optional information to be provided by the user during the procedure in Phase 2 also includes:
 - an indication of group registration, if needed. If no indication is given, registration of a single terminal access is assumed;

NOTE: This information was included in ETR 217 [1]. However, the support of multiple terminal registration was subsequently deleted from Phase 1. This information is therefore included in this ETR.

- whether subsequent answering of incoming UPT calls shall require authentication or not.

3.2.1.2 InCall deregistration

In addition to the possibilities in Phase 1, a registration for incoming calls can also be deregistered (cancelled) in the following way in Phase 2:

- other users, whether UPT users or non-UPT users, may deregister the UPT user to terminate the registration to a specific terminal access.

3.2.1.3 OutCall registration

Using the OutCall registration procedure, a UPT may register for outgoing calls to a particular terminal access to initiate a session. During the session, the UPT user will not have to authenticate himself any further (except possibly for an optional Personal Identification Number (PIN) code) in order to make subsequent outgoing calls. The terminal access registered to is personalized for the user and all outgoing calls from that terminal access will be charged to his UPT number. Only one UPT user may register for outgoing calls to a specific terminal access at the time. An OutCall registration may also be carried out as part of an AllCall registration procedure.

The identification and authentication procedures shall have been successfully completed before, or as a part of, this procedure.

During this procedure, the UPT user shall supply the following information.

The mandatory information is:

- UPT procedure type.

The optional information includes:

- an indication of group registration, if needed. If no indication is given, registration of a single terminal access is assumed;
- one or more Access Registration Addresses (ARAs), if needed (e.g. if the user chooses to specify another terminal access than the one he is currently using, or for group registration). Each ARA can be either a complete access address or a pointer to one of a number of pre-selected access addresses for registrations for outgoing UPT calls, stored in the UPT service profile.

if no address is specified, the address of the used terminal access is assumed;
- an indication of the telecommunication services to which the registration applies, if needed.

If no service is specified, the default services for registrations for outgoing UPT calls, indicated in the UPT service profile, are assumed;
- the duration of the registration, if needed. This may also be specified in terms of number of outgoing calls;
- whether a PIN code is required at each call set-up;
- whether any other UPT user shall be allowed to deregister the UPT user for outgoing calls from a terminal access by override.

The network will indicate to the UPT user if the registration is accepted or will give an appropriate announcement if not, and the procedure is terminated. Any rejection could depend on the authentication procedure, UPT service profile restrictions etc. Specifically, the registration will be rejected if another UPT user has already registered for outgoing calls to the terminal access specified (without permitting override).

This procedure is new for Phase 2.

3.2.1.4 OutCall deregistration

A registration for outgoing calls can be deregistered (cancelled) in the following ways:

- a) the UPT user can explicitly deregister;
- b) the UPT service Provider can specifically deregister the UPT user to terminate the registration;
- c) by timer or counter expiry;
- d) optionally, as given by the UPT user's registration for outgoing calls, another UPT user may register for outgoing calls to the same terminal access, thus causing the current registration to be cancelled (by override);
- e) other users, whether UPT users or non-UPT users, may deregister the UPT user to terminate the registration to a specific terminal access (for further study).

When all registrations for outgoing UPT calls have been deregistered, the registration will fall back to the default terminal access for outgoing call registration defined in the UPT service profile. Such a default terminal access can also include "no terminal access". Unless "no terminal access" is specified, the UPT user will thus never be completely deregistered for outgoing UPT calls.

The deregistration for outgoing calls procedure is used in case a), when the UPT user explicitly deregisters.

The identification and authentication procedures shall have been successfully completed before, or as a part of, this procedure.

During this procedure, the UPT user shall supply the following information.

The mandatory information is:

- UPT procedure type.

The optional information includes:

- an indication of group deregistration, if needed. If no indication is given, deregistration of a single terminal access is assumed;
- the Access Registration Address (ARA), if needed (i.e. if the user chooses to specify a terminal access other than the one he is currently using). Each ARA can be either a complete access address or a pointer to one of a number of pre-selected access addresses for registrations for outgoing UPT calls, stored in the UPT service profile. The ARA could also indicate all terminals registered for outgoing UPT calls.

If no address is specified, the address of the used terminal access is assumed;

- an indication of the telecommunication services to which the deregistration applies, if needed.

If no service is specified, all services to which the registration applied are assumed.

The network will indicate to the UPT user if the deregistration is accepted or give an appropriate announcement if not, and the procedure is terminated. Any rejection could depend on, for example, the authentication procedure, ARA or service specified not in line with the registration, etc.

This procedure is new for Phase 2.

3.2.1.5 AllCall registration

The InCall and OutCall registration procedures may be combined into a single user procedure, the AllCall registration procedure. If used, the effect of this AllCall registration procedure is as if an InCall registration and an OutCall registration procedure had been carried out separately to the same terminal access, and the input parameters and network responses seen by the UPT user would be exactly as if separate procedures were used.

This procedure is new for Phase 2.

3.2.1.6 AllCall deregistration

In the same manner as for AllCall registration, an AllCall deregistration procedure may be used to deregister an InCall and an OutCall registration to the same terminal access in one operation.

This procedure is new for Phase 2.

3.2.2 Optional procedures

3.2.2.1 Linked registration

The linked registration procedure is used not only to combine the InCall and OutCall registrations into one single procedure, but also to link the InCall and OutCall registrations to each other and to the same terminal access. A linked registration can only be changed by another linked registration (by override) or by a linked deregistration procedure. The procedure initiates a session during which the UPT user will not have to authenticate himself any further (except possibly for an optional PIN code) in order to make outgoing calls or receive incoming calls.

Only one UPT user may have a linked registration to a specific terminal access at the same time and only one terminal access can be part of a linked registration. A linked registration to a terminal access will further preclude any other registration to that terminal access, except InCall registrations by other UPT users.

The identification and authentication procedures shall have been successfully completed before, or as a part of, this procedure.

During this procedure, the UPT user shall supply the following information.

The mandatory information is:

- UPT procedure type.

The optional information includes:

- the duration of the registration, if needed. This may also be specified in terms of number of incoming and/or outgoing calls;
- the Access Registration Address (ARA), if needed (i.e. if the user chooses to specify a terminal access other than the one he is currently using). The ARA can be either a complete access address or a pointer to one of a number of pre-selected access addresses for linked registration, stored in the UPT service profile.

If no address is specified, the address of the used terminal access is assumed;

- an indication of the telecommunication services to which the registration applies, if needed.

If no service is specified, the default services for linked registration, indicated in the UPT service profile, are assumed;

- an indication of any special conditions to be placed on the registration, if needed (e.g. a list of permitted callers);
- whether a PIN code is required for each call set-up.

The network will indicate to the UPT user if the registration is accepted or give an appropriate announcement if not, and the procedure is terminated. Any rejection could depend on the authentication procedure, UPT service profile restrictions etc. Specifically, the registration will be rejected if another UPT user has already registered for outgoing calls to the requested terminal access.

This procedure is new for Phase 2.

3.2.2.2 Linked deregistration

A linked registration can be deregistered (cancelled) in the following ways:

- a) the UPT user can specifically deregister;
- b) the UPT user can perform a linked registration to another terminal access, thus causing the previous registration to be overridden;
- c) the UPT service Provider can specifically deregister the user to terminate the session;
- d) by timer or counter expiry.

When a linked registration has been deregistered, except when overridden by a new registration (case b)), the linked registration will be completely deregistered to "no terminal access".

The linked deregistration procedure is used in case a), when the UPT user explicitly deregisters.

The identification and authentication procedures shall have been successfully completed before, or as a part of, this procedure.

During this procedure, the UPT user shall supply the following information.

The mandatory information is:

- UPT procedure type.

The optional information includes:

- the Access Registration Address (ARA), if needed (i.e. if the user chooses to specify a terminal access other than the one he is currently using). The ARA can be either a complete access address or a pointer to one of a number of pre-selected access addresses for linked registration, stored in the UPT service profile.
If no address is specified, the address of the used terminal access is assumed;
- an indication of the telecommunication services to which the deregistration applies, if needed.
If no service is specified, the services to which the registration applied are assumed.

The network will indicate to the UPT user if the deregistration is accepted or give an appropriate announcement if not, and the procedure is terminated. Any rejection could depend on, for example, the authentication procedure, ARA or service specified not in line with the registration, etc.

This procedure is new for Phase 2.

3.3 UPT call Handling procedures

UPT call handling procedures are procedures relating to the actual making or receiving of UPT calls.

3.3.1 Essential procedures

3.3.1.1 Outgoing UPT call setup

This procedure is included in Phase 1. However, the UPT Abbreviated Dialling supplementary service has been added to Phase 1 and the possibility to use a short number code instead of the B-party address was not included in ETR 217 [1]. Therefore, for Phase 2, the mandatory information to be supplied by the user is:

- B-party address or short number code.

3.3.1.2 UPT registered outgoing call setup

This procedure is used to setup outgoing calls from a terminal access to which a UPT user has registered for outgoing UPT calls. The outgoing calls will be charged to the UPT number.

During this procedure, the user shall supply the following information.

The mandatory information is:

- B-party address or short number code.

The optional information is:

- OutCall access code;

NOTE: This special access code may be required in order for a visited, non-IN node or network to route the call to a handling IN-based node or network.

- PIN code (if requested by the UPT user at registration time).

The network will indicate to the user if the procedure is not accepted, and the procedure is terminated. Any rejection could depend on PIN code mismatch, UPT service profile restrictions, etc.

This procedure is new for Phase 2.

3.3.2 Optional procedures

3.3.2.1 Alerting for incoming UPT calls

This procedure is used by the UPT service for alerting of incoming UPT calls to UPT users. It can only be carried out towards a UPT user if he has registered for incoming calls beforehand.

The network performs an alerting for incoming UPT calls on the terminal accesses given by the UPT user's registration for incoming calls. This may be one or several terminal accesses, including dedicated paging terminals.

If the UPT user has a registration for incoming calls indicating "no terminal access", the calling user will receive an appropriate indication that "UPT user currently not reachable". No charges will be incurred to the calling user.

The procedure is terminated in one of the following ways:

- a) by explicit action from the calling party;
- b) by a successful answering of incoming UPT calls procedure;
- c) by timer expiry.

During this procedure, no information needs to be supplied by the UPT user.

NOTE: The alerting mechanism may differentiate UPT incoming calls from non-UPT incoming calls, as well as UPT incoming calls to different UPT users.

This procedure is new for Phase 2.

3.3.2.2 Answering of incoming UPT calls

Having registered for incoming calls, this procedure is used by the UPT user to answer incoming UPT-calls indicated to him by the alerting for incoming UPT calls procedure. When the answering of incoming UPT calls procedure is successfully terminated, call completion can proceed in the normal way.

When alerted by the alerting for incoming UPT calls procedure, the UPT user answers this alerting on a terminal of his choice, given by his registration for incoming calls. If he is registered for incoming calls on a paging terminal, then any terminal can be used for answering the incoming UPT call.

The identification and authentication procedures may have to be successfully completed before, or as a part of, this procedure, if required.

During this procedure, the UPT user shall supply the following information:

If the answering is performed at another terminal access than the one at which the alerting was received, then the mandatory information is:

- UPT procedure type,

else no mandatory information is needed.

No optional information is needed.

The network will indicate to the UPT user if the call answering is accepted or give an appropriate announcement if not, and the procedure is terminated. Any rejection could depend on, for example, the authentication procedure.

This procedure is new for Phase 2.

3.4 UPT service profile management procedures

UPT service profile management procedures are procedures used by the UPT user in order to manage his own accessible UPT service profile data.

UPT service profile management procedures are procedures which in many cases may be rather complicated, and which most successfully may be implemented in an interactive way on advanced terminals. This should not preclude, however, the use of such procedures with a single command and response on simple terminals.

3.4.1 Essential procedures

3.4.1.1 Profile interrogation

NOTE: This procedure was included in ETR 217 [1]. However, the support of this feature in Phase 1 was by administrative procedures and not by the ETR 217 [1] procedure. This procedure is, therefore, included in this ETR.

A UPT user uses the profile interrogation procedure to obtain information on the current status of the UPT user's own service profile.

The identification and authentication procedures shall have been successfully completed before, or as a part of, this procedure.

During this procedure, the UPT user shall supply the following information.

The mandatory information is:

- UPT procedure type.

The optional information includes:

- information concerning the type of UPT service profile information that is requested. Such information could include information like telecommunications services subscribed to, default parameters, activated supplementary services, current registrations for incoming or outgoing calls, etc.

The network will respond with the wanted information to the UPT user if the information can be disclosed, and the procedure is terminated. Any rejection could depend on the authentication procedure, UPT service profile restrictions, etc.

3.4.1.2 Profile modification

This procedure is included in Phase 1.

3.4.1.3 Change PIN

NOTE: This procedure has been added to Phase 1. However, the procedure was not described in ETR 217 [1] and the description is therefore included in this ETR.

The Change PIN procedure is used by the UPT user in order to change the PIN used for weak authentication.

The identification and authentication procedures shall have been successfully completed before, or as a part of, this procedure.

During this procedure, the UPT user shall supply the following information.

The mandatory information is:

- UPT procedure type;
- the new PIN (entered twice for verification).

No optional information is needed.

The network will indicate to the UPT user if the change of the PIN is accepted or give an appropriate announcement if not, and the procedure is terminated. Any rejection could depend on the authentication procedure, incorrectly verified new PIN, UPT service profile restrictions, etc.

NOTE: It is assumed that in case the Personal User Identification (PUI) is blocked for some reason, it can be unblocked by the authentication procedure being carried out using a special PIN (e.g. a long PIN). See also ETS 300 391-1 [2].

3.4.2 Optional procedures

None identified.

3.5 Procedures for the Support of UPT supplementary services

These are specific UPT procedures for the support of supplementary services. It should be noted that these procedures cover only a subset of the UPT supplementary services. The general handling of the UPT supplementary services is covered by the profile modification procedure.

3.5.1 Essential procedures

None identified.

3.5.2 Optional procedures

3.5.2.1 Activate UPT supplementary service

This procedure is used by the UPT user in order to activate a specific service.

The identification and authentication procedures shall have been successfully completed before, or as a part of, this procedure.

During this procedure, the UPT user shall supply the following information.

The mandatory information is:

- UPT procedure type;
- information concerning the service that is wanted activated.

No optional information is needed.

The network will indicate to the UPT user if the activation is accepted or give an appropriate announcement if not, and the procedure is terminated. Any rejection could depend on the authentication procedure, UPT service profile restrictions, etc.

This procedure is new for Phase 2.

3.5.2.2 Deactivate UPT supplementary service

This procedure is used by the UPT user in order to deactivate a specific service.

The identification and authentication procedures shall have been successfully completed before, or as a part of, this procedure.

During this procedure, the UPT user shall supply the following information.

The mandatory information is:

- UPT procedure type;
- information concerning the service that is wanted deactivated.

No optional information is needed.

The network will indicate to the UPT user if the deactivation is accepted or give an appropriate announcement if not, and the procedure is terminated. Any rejection could depend on the authentication procedure, UPT service profile restrictions, etc.

This procedure is new for Phase 2.

3.6 Exceptional procedures

Exceptional procedures are procedures intended for the protection of the privacy, integrity and security of third parties (e.g. subscriber of terminal access). These procedures are intended to be carried out by third parties, i.e. non-UPT users, and thus identification and authentication are not required for any of them.

3.6.1 Essential procedures

None identified.

3.6.2 Optional procedures

3.6.2.1 Reset of registrations for incoming UPT calls

Reset of registrations for incoming UPT calls is a means for a third party to explicitly deregister all UPT users which may have registered for incoming UPT calls to a terminal access. This procedure cancels all registrations for incoming UPT calls to a specific terminal access. No announcement is given to the deregistered UPT users.

No identification or authentication procedures are required in connection with this procedure.

During this procedure, the user shall supply the following information.

The mandatory information is:

- UPT procedure type.

No optional information is needed.

The address of the used terminal access will be assumed for the reset. Reset of a remote terminal is thus not allowed.

In case a registration for incoming UPT calls to the terminal access is part of a group registration, the effect should be as if this group registration had been deregistered, i.e. all terminal accesses part of the group registration should be cancelled, and the registration for the UPT user in question should fall back to the default terminal accesses for incoming calls.

The network will indicate to the user if the reset is accepted or give an appropriate announcement if not, and the procedure is terminated. Any rejection could e.g. occur when there is no registration for incoming calls to the used terminal access.

This procedure is new for Phase 2.

3.6.2.2 Blocking of registrations for incoming UPT calls

The blocking of registrations for incoming UPT calls is a means for third parties to prohibit UPT users to register for incoming calls to a specific terminal access. When this procedure has been carried out, any attempts by UPT users to register for incoming UPT calls to the terminal access will be rejected.

No identification or authentication procedures are required in connection with this procedure.

During this procedure, the user shall supply the following information.

The mandatory information is:

- UPT procedure type.

No optional information is needed.

The address of the used terminal access is assumed for the blocking. Blocking of a remote terminal is thus not allowed.

The network will indicate to the user if the blocking is accepted or give an appropriate announcement if not, and the procedure is terminated.

This procedure is new for Phase 2.

3.6.2.3 Deblocking of registrations for incoming UPT calls

The deblocking of registrations for incoming UPT calls is a means for third parties to open a terminal access for subsequent registrations for incoming UPT calls. When this procedure has been carried out, any UPT user may register for incoming UPT calls to the terminal access.

No identification or authentication procedures are required in connection with this procedure.

The address of the used terminal access is assumed for the deblocking. Deblocking of a remote terminal is thus not allowed.

The network will indicate to the user if the deblocking is accepted or give an appropriate announcement if not, and the procedure is terminated.

This procedure is new for Phase 2.

3.6.2.4 Reset of registration for outgoing UPT calls

The reset of registration for outgoing UPT calls is a means for third parties to explicitly deregister the UPT user who has registered for outgoing calls to a specific terminal access. No announcements will be given to the deregistered UPT user.

No identification or authentication procedures are required in connection with this procedure.

During this procedure, the user shall supply the following information.

The mandatory information is:

- UPT procedure type.

No optional information is needed.

The address of the used terminal access is assumed for the reset. Reset of a remote terminal is thus not allowed.

In case the registration for outgoing UPT calls to the used terminal access was part of a group registration, only the used terminal access should be cancelled from the group.

The network will indicate to the user if the reset is accepted or give an appropriate announcement if not, and the procedure is terminated. Any rejection could, for example, occur when there is no registration for outgoing calls to the used terminal access.

This procedure is new for Phase 2.

4 UPT user states

4.1 Introduction

This subclause identifies the possible UPT user states in terms of **personal mobility** only, and its consequences on charging and possible actions. It should be noted that the states concern UPT **users**, not terminals.

4.2 General Requirements on personal mobility states

The UPT user may carry out a set of actions. These may relate to any of the types of UPT procedures listed above, and may be carried out by the reference UPT user (i.e. the UPT user concerned) or by another UPT user, and may concern the current terminal access or another terminal access. In principle, these actions may all influence the personal mobility state of the reference UPT user.

In terms of the personal mobility only, any UPT user may register/deregister for incoming UPT calls and for outgoing UPT calls. When registered for incoming calls, the registration may also require authentication of the UPT user when receiving UPT calls or not (simplified registration). In addition, a special case exists when the registrations for incoming and outgoing UPT calls are linked to the same terminal (linked registration). Summarized, this leaves a total of seven possible personal mobility states:

| | |
|--------------------------|--|
| State 0: DETACHED | (Deregistered for incoming calls, deregistered for outgoing calls). |
| State 1: READY_TO_CALL | (Deregistered for incoming calls, registered for outgoing calls). |
| State 2: REACHABLE | (Registered for incoming calls - further authentication required, deregistered for outgoing calls). |
| State 3: READY_TO_ANSWER | (Registered for incoming calls - no further authentication required, deregistered for outgoing calls). |
| State 4: ATTACHED | (Registered for incoming calls - further authentication required, registered for outgoing calls). |
| State 5: READY_FOR_ALL | (Registered for incoming calls - no further authentication required, registered for outgoing calls). |
| State 6: LINKED | (READY_FOR_ALL with linked registrations for incoming and outgoing calls). |

NOTE 1: When registered for outgoing calls, the UPT user may have the option of entering a PIN code before each outgoing call. This may in principle add a sub-state to each of the user states 1, 4, 5 and 6, but these are not listed as separate states.

NOTE 2: The usefulness of having a simplified authentication procedure in connection with state 6 (LINKED), which is mainly intended to cover the PSTN case, is for further study.

The following general requirements apply to the personal mobility states for a specific basic service:

- procedures other than personal mobility procedures will not influence the personal mobility state. Specifically, a UPT user may in each personal mobility state use a UPT specific procedure like outgoing UPT call setup to make an outgoing UPT call. A UPT user may also in each personal mobility state interrogate or modify his UPT service profile;
- registration for incoming UPT calls and registration for outgoing UPT calls are completely independent actions, except when these are linked together by use of the linked registration procedure. To the linked registration procedure more restrictive requirements apply due to this linkage. The only way to modify or cancel a linked registration is by another linked registration procedure (overriding the previous), by a linked deregistration procedure or by an exceptional procedure;
- the effects of the AllCall registration/deregistration procedures, if used, are exactly as if an InCall and an OutCall registration/deregistration procedure had been carried out separately by the same UPT user for the same terminal access;
- a UPT user may not have more than one registration for incoming UPT calls at the same time. A new registration for incoming UPT calls will cancel the previous registration. This does not prevent, however, that a UPT user within one registration procedure may define a set of incoming call addresses where he may be searched either simultaneously or in sequence;
- a UPT user may have more than one registration for outgoing UPT calls at the same time;
- several UPT users may be registered for incoming UPT calls to the same terminal access simultaneously;
- due to charging implications, more than one UPT user may not be registered for outgoing UPT calls to the same terminal access simultaneously;
- the UPT service Provider may explicitly deregister the UPT user in any personal mobility state;
- in general, only the reference UPT user can override his/her own registrations. As an option specified in the reference UPT user's OutCall registration, however, other UPT users may override OutCall registrations;
- in exceptional cases, non-UPT users, via exceptional UPT procedures, may deregister an InCall or OutCall registration to their terminal access. Non-UPT users may also in exceptional cases temporarily suspend an OutCall registration or block their terminal accesses for InCall registrations or incoming UPT calls. Remote operation of exceptional procedures is not allowed.

The different UPT user states will be described in the following subclauses. A summary of the network responses to the personal mobility procedures in the different UPT user states is also given in table 1. The table describes the effects of a UPT user's personal mobility procedures with respect to the UPT user's own registration states. The interactions with other UPT users are not shown.

4.3 Description of state 0 (DETACHED)

In this state, the reference UPT user is completely detached from the UPT service and cannot receive incoming calls, nor can he make outgoing UPT calls without first using a specific UPT procedure requiring authentication. Consequently, his associated UPT subscription will not be charged for anything without involving further UPT-specific actions.

In this state, the UPT service entity cannot locate the UPT user, and any calling subscriber may receive an announcement to this effect:

- if, in this state, the reference UPT user attempts to register for incoming UPT calls or outgoing UPT calls to any terminal, this may be allowed;
- if, in this state, the reference UPT user attempts to deregister for incoming UPT calls or outgoing UPT calls to any terminal, this should be rejected, and an announcement should be given to him indicating that he is already deregistered.

Any actions of other UPT users do not affect the reference UPT user in this state.

4.4 Description of state 1 (READY_TO_CALL)

In this state, the reference UPT user has registered for outgoing UPT calls to a terminal so that he can make outgoing UPT calls **without** first using a specific UPT procedure requiring authentication, or optionally, if indicated in the registration procedure, to use a simplified authentication in the form of PIN code. In this state, all outgoing UPT calls from the terminal will be charged to the UPT subscription associated with the reference UPT user according to the charging principles.

It should be noted that from a technical point of view, it is not necessary to register for outgoing UPT calls in order to be able to make outgoing calls. The sole purpose of this state is to give the UPT user the possibility to avoid any specific UPT procedure (except for the optional PIN code), each time he wants to make an outgoing UPT call:

- if, in this state, the reference UPT user attempts to register for outgoing UPT calls to the same terminal access, this should be allowed, and the previous registration should be cancelled;
- if, in this state, another UPT user attempts to register for outgoing UPT calls to the same terminal access, this should be rejected (unless the optional override by other UPT users was allowed by the registration for outgoing calls), and an announcement should be given to him indicating that another UPT user has already registered for outgoing UPT calls to this terminal access;

if, however, the optional override by other UPT users is allowed, then the registration by the other UPT user should be accepted and the registration for the reference UPT user should be cancelled;
- if, in this state, the reference UPT user attempts to register for outgoing UPT calls to another terminal, this should be allowed, without influencing the previous registration;
- in this state, the reference UPT user may explicitly deregister for outgoing calls, on a terminal by terminal basis, or for all at once.

Any actions concerning registration/deregistration for incoming UPT calls to the same terminal are of no influence to the reference UPT user. Neither do any actions carried out by another UPT user concerning other terminals.

4.5 Description of state 2 (REACHABLE)

In this state, the reference UPT user has registered for incoming UPT calls to one or several terminal accesses so that he can receive incoming calls, but the reference UPT user will have to use the answering of incoming UPT calls procedure **requiring authentication**. The UPT subscription associated with the reference UPT user will be charged for incoming UPT calls according to the charging principles:

- if, in this state, the reference UPT user attempts to register for incoming UPT calls to the same terminal access, this should be allowed, and the previous registration should be cancelled;
- if, in this state, another UPT user attempts to register for incoming UPT calls to the same terminal access, this should be allowed and should not influence the reference UPT user;
- if, in this state, the reference UPT user attempts to register for incoming UPT calls to another terminal, this should be allowed, and the previous registration should be cancelled;
- in this state, the reference UPT user may explicitly deregister for incoming calls.

Any actions concerning registration/deregistration for outgoing UPT calls to the same terminal are of no influence to the reference UPT user. Neither do any actions carried out by another UPT user concerning other terminals.

4.6 Description of state 3 (READY_TO_ANSWER)

This state is identical to state 2 (REACHABLE), but the reference UPT user will **not** have to carry out any UPT specific procedures requiring authentication before he can receive incoming UPT calls. The UPT subscription associated with the reference UPT user will be charged for incoming UPT calls according to the charging principles.

4.7 Description of state 4 (ATTACHED)

In this state, the reference UPT user has registered for outgoing UPT calls to a terminal so that he can make outgoing UPT calls **without** any authentication procedure (or optionally by using a simplified authentication in the form of PIN code). In this state, all outgoing UPT calls will be charged to the UPT subscription associated to the reference UPT user according to the charging principles.

In this state, the reference UPT user has also registered for incoming UPT calls to a terminal so that he can receive incoming calls, but the reference UPT user will have to use the answering of incoming UPT calls procedure **requiring authentication**. The UPT subscription associated with the reference UPT user will be charged for incoming UPT calls according to the charging principles.

The restrictions on this state are exactly the same as for state 1 concerning outgoing calls, and exactly the same as for state 2 concerning incoming calls.

The registration for incoming UPT calls and outgoing UPT calls may concern the same terminal or different terminals. This state applies to the UPT user, not to a terminal.

4.8 Description of state 5 (READY_FOR_ALL)

This state is identical to state 4 (ATTACHED), but the reference UPT user will **not** have to carry out any UPT specific procedures requiring authentication before he can receive incoming UPT calls. The UPT subscription associated with the reference UPT user will be charged for incoming and outgoing UPT calls according to the charging principles.

4.9 Description of state 6 (LINKED)

This state is identical to state 5 (READY_FOR_ALL), but with the restriction that the registrations for incoming and outgoing calls are linked together and to the same terminal access (linked registration), and is used in order to provide a user-friendly combined registration for incoming and outgoing calls (e.g. leaving the situation of a standard PSTN terminal). This implies the following differences from state 5 (READY_FOR_ALL):

- if, in this state, the reference UPT user attempts to register for incoming UPT calls to the same or another terminal access, this should be rejected, and an announcement should be given to him indicating that he has already performed a linked registration to a terminal access;
- if, in this state, the reference UPT user or any other UPT user attempts to register for outgoing UPT calls to the same terminal access, this should be rejected, and an indication should be given to the effect that there is already a linked registration to the terminal access;
- if, in this state, the reference UPT user attempts to perform a linked registration to another terminal access, this should be allowed, and the previous linked registration should be cancelled;
- in this state, the UPT user may also explicitly perform a linked deregistration procedure. Exit from this state is only possible by explicit deregistration (i.e. by linked deregistration) or implicit deregistration (i.e. by override with another linked registration);
- override by other UPT users is not allowed in this state by any UPT procedure.

Table 1: Network responses to UPT user procedures in different user states

| State: | Procedure: (for terminal a) | | | | | | | |
|--|--------------------------------|---------|----------------------------|----------------------------|---------|---------|------------------|---------|
| | Reg.inc | Reg.out | Reg.all | Reg.lnk | Der.inc | Der.out | Der.all | Der.lnk |
| 1: D.inc/D.out (any terminal) (state 0) | AIR(a) | AOR(a) | AIR(a) AOR(a) | ALR(a) | RID(a) | ROD(a) | RID(a) ROD(a) | RLD(a) |
| 2: D.inc/R.out (to terminal /a) (state 1) | AIR(a) | AOR(a) | AIR(a) AOR(a) | ALR(a) OOR(a) | RID(a) | AOD(a) | RID(a) AOD(a) | RLD(a) |
| 3: D.inc/R.out (to terminal /b) (state 1) | AIR(a) | AOR(a) | AIR(a) AOR(a) | ALR(a) | RID(a) | ROD(a) | RID(a) ROD(a) | RLD(a) |
| 4: R.inc/D.out (to terminal a/) (state 2/3) | AIR(a) | AOR(a) | AIR(a) AOR(a) | ALR(a) OIR(a) | AID(a) | ROD(a) | AID(a) ROD(a) | RLD(a) |
| 5: R.inc/D.out (to terminal b/) (state 2/3) | AIR(a) OIR(b) | AOR(a) | AIR(a) OIR(b) AOR(a) | ALR(a) OIR(b) | RID(a) | ROD(a) | RID(a) ROD(a) | RLD(a) |
| 6: R.inc/R.out (to terminal a/a) (state 4/5) | AIR(a) | AOR(a) | AIR(a) AOR(a) | ALR(a) OOR(a) OIR(a) | AID(a) | AOD(a) | AID(a) AOD(a) | RLD(a) |
| 7: R.inc/R.out (to terminal a/b) (state 4/5) | AIR(a) | AOR(a) | AIR(a) AOR(a) | ALR(a) OIR(a) | AID(a) | ROD(a) | AID(a) ROD(a) | RLD(a) |
| 8: R.inc/R.out (to terminal b/a) (state 4/5) | AIR(a) OIR(b) | AOR(a) | AIR(a) OIR(b) AOR(a) | ALR(a) OIR(b) OOR(a) | RID(a) | AOD(a) | RID(a) AOD(a) | RLD(a) |
| 9: R.inc/R.out (to terminal b/b) (state 4/5) | AIR(a) OIR(b) | AOR(a) | AIR(a) OIR(b) AOR(a) | ALR(a) OIR(b) | RID(a) | ROD(a) | RID(a) ROD(a) | RLD(a) |
| 10: Linked (to terminal a) (state 6) | RIR(a) | ROR(a) | RIR(a) ROR(a) | ALR(a) | RID(a) | ROD(a) | RID(a) ROD(a) | ALD(a) |
| 11: Linked (to terminal b) (state 6) | RIR(a) | AOR(a) | RIR(a) AOR(a) | ALR(a) OLR(b) | RID(a) | ROD(a) | RID(a) ROD(a) | RLD(a) |

Syntax: Accept/Reject/Override (A/R/O)
 Incoming/Outgoing/Linked (I/O/L)
 Registration/Deregistration (R/D)
 (terminal a/terminal b) (a/b)

Procedures: Reg.inc = InCall Registration Der.inc = InCall Deregistration
 Reg.out = OutCall Registration Der.out = OutCall Deregistration
 Reg.all = AllCall Registration Der.all = AllCall Deregistration
 Reg.lnk = Linked Registration Der.lnk = Linked Deregistration

States: D.inc = Deregistered for incoming calls R.inc = Registered for incoming calls
 D.out = Deregistered for outgoing calls R.out = Registered for outgoing calls

History

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