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**OPERATIONS AND QUALITY OF SERVICE  
UNIVERSAL PERSONAL TELECOMMUNICATION**

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**UNIVERSAL PERSONAL TELECOMMUNICA-  
TION (UPT) – SERVICE DESCRIPTION  
(SERVICE SET 1)**

**ITU-T Recommendation F.851**

(Previously “CCITT Recommendation”)

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## FOREWORD

The ITU-T (Telecommunication Standardization Sector) is a permanent organ of the International Telecommunication Union (ITU). The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, March 1-12, 1993).

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## NOTE

In this Recommendation, the expression “Administration” is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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## **SUMMARY**

This Recommendation “Universal Personal Telecommunication (UPT) – Service Description (Service Set 1)” provides the service description and operational provisions for Universal Personal Telecommunication (UPT).

It describes the main principles of UPT, for example personal mobility, authentication and service profile management. It defines the UPT service aspects from the user’s perspective (e.g. numbering and charging aspects). It also describes the essential features necessary to provide the UPT service, and the optional features which may be used to support additional enhancements.

UPT Service Set 1 is a restricted scenario that provides UPT service that supports provision of telephone service over PSTN, ISDN and PLMN networks. UPT Service Set 2 is currently under discussion, and represents a more enhanced scenario with more features and capabilities (e.g. support of data services).

## **UNIVERSAL PERSONAL TELECOMMUNICATION (UPT) – SERVICE DESCRIPTION (SERVICE SET 1)**

*(Geneva, 1994)*

### **1 General**

#### **1.1 Scope**

This Recommendation is intended to provide the service description and operational provisions for Universal Personal Telecommunication (UPT).

Following the principles laid down in Recommendation F.850, “Principles of UPT”, this Recommendation provides the general service description from the point of view of the individual UPT subscriber or UPT user. It does not consider network implementation or regulatory issues.

For the purpose of this Recommendation, the term UPT Service(s) describes the offering of a combination of network capabilities together with the appropriate user-network interface facilities which enable each UPT user to participate in a user-defined set of subscribed services. This offering may vary according to the scope of such capabilities that the service provider may wish to offer.

#### **1.2 General description**

UPT introduces the concept of UPT number. In fixed telecommunication networks, a user or subscriber is associated with the network access point of the terminal, the point of attachment of the terminal. In certain mobile telecommunication networks, a user or subscriber is associated with the specific terminal in use.

In the UPT environment, the fixed association between terminal and user identification is removed. In order to offer users the capability of establishing and receiving calls on any terminal and at any location, the identification of UPT users is treated separately from the addressing of terminals and network access points. UPT user identification is achieved by means of a UPT number. The UPT user is therefore personally associated with his or her own UPT number, which is used as the basis for making and receiving calls. The UPT number is diallable on a global basis and routable from any fixed or mobile terminal, across multiple networks irrespective of geographical location, limited only by the terminal and network capabilities and any restrictions imposed by the network operator. The UPT user may be assigned one or more UPT numbers.

UPT also allows the UPT user to participate in a user-defined set of subscribed services, from amongst which the user defines personal requirements, to form a UPT service profile.

The following summary of both, short-term and long-term UPT objectives include:

a) *UPT service profile*

A personalized UPT service profile which contains a list of services and facilities subscribed to by the UPT subscriber, and a range of options.

b) *Personal numbering*

A UPT number, which uniquely identifies each UPT user and is used by the caller to reach that UPT user. A UPT user may have more than one UPT number for different applications (for example, a business UPT number for business calls and a private UPT number for private calls).

c) *Personal charging*

Charging, which is associated with the UPT number rather than with any terminal or network used by the UPT user.

d) *Simple billing*

Preferably, a UPT subscriber will only receive bills from one UPT service provider even though UPT facilities may have been used in different networks, in different countries and using different network operators.

e) *Terminal independence*

Telecommunication services are provided to the UPT user, independent of the terminal used. The terminal, if capable of providing the services requested by the UPT user, will make them available to the UPT user.

f) *Security and privacy*

The UPT user may use the UPT service with minimal risk of violated privacy or erroneous charging due to fraudulent use.

g) *Automation of user interaction with the UPT service*

The UPT users may make use of means to facilitate and automate their interactions with the UPT service.

h) *Access from multiple networks*

The UPT service may be used across multiple networks (e.g. PSTN, ISDN, PLMN, PDNs etc.) using the same UPT number. The serving network, if capable of supporting the services requested by the UPT user, may make them available to the UPT user.

UPT may also operate over private networks if the private networks agree to UPT interworking with the public network.

i) *Universal service availability*

In principle, any basic telecommunications service can be used with the UPT service. The services provided to the UPT user are only limited by the networks and terminals used.

j) *Dynamic registration of terminal address*

The UPT user may dynamically and independently register with the terminal addresses at which he will make or receive calls. The registered terminal addresses may differ from service to service.

k) *Subscription involving multiple UPT users*

One UPT subscriber may be responsible for more than one UPT user, each having a personal UPT number and an associated UPT service profile (e.g. a company having a set of employees).

l) *Privacy for third parties*

Third party users (e.g. terminal owners) will in principle, not suffer in terms of privacy or freedom of actions as a result of UPT activities by UPT users.

Early implementations of UPT may not be able to realize all these objectives. Provision of UPT services is expected to commence with a simplified set of essential and optional UPT features and capabilities, which will evolve into more advanced scenarios. Evolution of UPT is described in 2.1.

### 1.3 Definitions and terminology

The following definitions of UPT terms used throughout this Recommendation are consistent with the abbreviated definitions in Recommendation I.114 "Vocabulary of Terms for Universal Personal Telecommunication".

**1.3.1 authentication:** A process by which the verification of the UPT user identity is accomplished.

**1.3.2 call:** In the UPT context, "call" is used to indicate telephony, data, facsimile, ISDN, B-ISDN, etc. calls.

**1.3.3 charging reference location:** The geographical location that may be used by the UPT service providers to determine the distance-related charges applying to the calling party and/or called UPT user.

**1.3.4 identification:** A process to identify the UPT user or the UPT service provider.

**1.3.5 network limitations:** The UPT-serving (or UPT-supporting) network should provide a UPT user with access to all services delineated in the UPT user's personal UPT service profile. However, the serving network may not be capable of providing, or may choose not to provide, all such services for reasons which may include coverage limitations, regulatory restrictions and domestic or international safety or other requirements.

**1.3.6 personal mobility:** The ability of a user to access telecommunication services at any terminal on the basis of a personal identifier (e.g. the UPT number), and the capability of the network to provide those services delineated in the user's service profile. Personal mobility involves the network capability to locate the terminal associated with the user for the purposes of addressing, routing and charging of the UPT user's calls.

**1.3.7 terminal address:** A number used to identify a unique terminal or fixed network access point on a network.

**1.3.8 terminal limitation:** A UPT user accessing a network that is providing the full services of the UPT user's personal UPT service profile is only limited by the capabilities that the terminal attached to the network can support.

**1.3.9 terminal mobility:** The ability of the terminal to access telecommunication services from different locations while in motion, and the capability of the network to identify and locate that terminal.

**1.3.10 UPT (Universal Personal Telecommunication):** UPT enables access to telecommunication services while allowing personal mobility. It enables each UPT user to participate in a user-defined set of subscribed services and to initiate and receive calls on the basis of a personal, network-transparent UPT number across multiple networks on any fixed or mobile terminal, irrespective of geographical location, limited only by terminal and network capabilities and restrictions imposed by the network operator.

**1.3.11 UPT access code:** A code the UPT users may need to dial, when using certain terminals and networks, in order to enter the UPT environment before any UPT procedures can be carried out.

**1.3.12 UPT environment:** The environment within which the facilities of the UPT service are offered. It consists of combinations of networks and UPT service control facilities, which when combined, enable the UPT user to make use of the telecommunication services offered by these networks.

To the UPT user, the UPT environment appears as one global network which provides personal mobility. However, when making use of telecommunication services, the UPT user may be limited by restrictions imposed by the network, by the capabilities of the terminals and networks used, or by regulatory requirements.

**1.3.13 UPT number:** A number that uniquely identifies a UPT user; it is also used by a calling party to reach that UPT user. A UPT user may have more than one UPT number (for example, a business UPT number for business calls and a private UPT number for private calls).

**1.3.14 UPT procedures:** UPT procedures, as seen by the UPT user, are procedures that must be carried out in order to ensure that the UPT user is able to make or receive calls.

**1.3.15 UPT service profile:** The UPT service profile is a record containing all the information related to a UPT user in order to provide that user with the UPT service. Each UPT service profile is associated with a single UPT number.

**1.3.16 UPT service profile management:** The capability to access, interrogate and modify the UPT service profile.

**1.3.17 UPT service provider:** A service provider, to which a UPT user must subscribe for use of the facilities of UPT. The service provider will make the arrangements necessary for the provision of such facilities.

**1.3.18 UPT subscriber:** A person or legal entity having specifically subscribed to a UPT service provider for UPT services to be used by one or more UPT users. The subscriber defines, and may modify, the limits within which such users can modify their personal service profile. The subscriber is responsible for payment of the charges due to that service provider. The UPT subscriber may also be the UPT user.

**1.3.19 UPT user:** A person or entity having access to UPT services and having been assigned one or more UPT numbers. The UPT user may also be the UPT subscriber.

**1.3.20 UPT user group:** A specific set of UPT users.

## **2 Basic considerations**

### **2.1 Evolution of UPT**

UPT is expected to materialize over a period of time and will experience an evolutionary path that is heavily impacted by evolving market needs and advances in technology. Provision of the UPT service will start with a simplified set of essential and optional UPT features and capabilities and progress into more advanced scenarios. Standardization of UPT may therefore be split into three general phases.

#### **2.1.1 UPT Service Set 1 – Restricted short-term UPT service scenario**

In this scenario, available network capabilities may result in restrictions on the level of services, security and user-friendly features that can be offered. The restricted short-term UPT service scenario provides UPT service over the PSTN, ISDN and PLMN networks. Only the telephone service is supported in this scenario.

#### **2.1.2 UPT Service Set 2 – Basic UPT service scenario**

The basic UPT service scenario will incorporate more services and networks, moving towards full universal service availability, terminal independence and operation across multiple networks. In this scenario, for example, various data services may be provided.

#### **2.1.3 UPT Service Set 3 – Enhanced UPT service scenario**

The enhanced UPT service scenario is the long-term scenario. It is also likely that, in the future, several technological and market developments may give rise to evolutionary phases of the UPT service, which cannot be foreseen today.

This Recommendation is devoted to the definition of UPT features and procedures for Service Set 1. Consequently, UPT Service Set 1 features and procedures specified in the remainder of this Recommendation are generally referred to as UPT features and UPT procedures.

### **2.2 Summary of UPT features**

UPT Service Set 1 supports the following restricted set of features and supplementary services:

#### **2.2.1 Services provided**

Only the telephone service is envisaged for Service Set 1.

#### **2.2.2 Networks involved**

All voice networks (e.g. PSTN, ISDN and PLMN).

#### **2.2.3 Essential UPT features**

- a) UPT user identity authentication;
- b) InCall registration;
- c) Outgoing UPT call;
- d) InCall Delivery.

#### **2.2.4 Optional UPT features**

- a) Remote InCall registration;
- b) OutCall registration;
- c) Remote OutCall registration;
- d) OutCall follow-on;
- e) Global follow-on;
- f) AllCall registration;
- g) Remote AllCall registration;
- h) Linked registration;
- i) Remote Linked registration;

- j) UPT-specific indications;
- k) UPT service profile interrogation;
- l) UPT service profile modification;
- m) Multiple Terminal Address registration;
- n) Call Pick Up;
- o) Variable default InCall registration;
- p) Intended Recipient Identity Presentation;
- q) Access to groups of UPT service profiles;
- r) UPT service assistance;
- s) Called party specified secure answering of incoming UPT calls;
- t) UPT service provider authentication.

### **2.2.5 Supplementary services**

(See 3.3.)

### **2.2.6 Numbering**

UPT numbering is based on a personal UPT number which uniquely identifies the UPT user.

### **2.2.7 Charging**

Location related charges are based on the caller's location and the current location of the called UPT user.

### **2.2.8 Service profiles**

Personalized UPT service profile to enable UPT user and subscriber control and flexibility in the selection of the UPT user telecommunication services.

### **2.2.9 Third party protection mechanisms**

- a) *Essential mechanisms* (see 4.6.3.1)  
None identified.
- b) *Optional mechanisms* (see 4.6.3.2)
  - 1) Exemption from any UPT usage;
  - 2) indications of UPT registrations (see 4.6.3.2.1);
  - 3) reset of registrations for incoming UPT calls (see 4.6.3.2.2);
  - 4) blocking/deblocking of registrations for incoming UPT calls (see 4.6.3.2.3);
  - 5) blocking/deblocking of incoming UPT calls (see 4.6.3.2.4);
  - 6) reset of registration for outgoing UPT calls (see 4.6.3.2.5);
  - 7) suspension of registration for outgoing UPT calls (see 4.6.3.2.6).

## **2.3 UPT user perspective**

### **2.3.1 Quality of Service**

In general, telecommunication services extended to UPT users via the UPT service should conform to the quality of service provisions for those telecommunication services. The transmission quality should not be influenced by the application of the UPT service. That is, the transmission quality perceived by the caller should be comparable to that obtained if the caller had dialled the number of the terminal at which the UPT call is answered. Other factors such as traffic, connection processing delay and availability may be affected by the UPT service resulting in the provision of different levels of quality to meet different end user needs.

In addition, a UPT user should in no way harm the visited network or degrade the quality of service of normal services.

### 2.3.2 Human factors

UPT facilities should be easy-to-use and consistent across terminal types and geographic and network boundaries so as not to deter the user from using the UPT service.

The UPT user therefore, should not have to manually enter a large amount of information to use basic features. Similar procedures across service providers should be used for UPT access and authentication, and use of UPT procedures. Such similar procedures would simplify the UPT user interaction, reduce user errors and facilitate a degree of automation.

## 3 Definitions of UPT features

A summary list of UPT features is presented in 2.2. In this clause definitions of essential and optional UPT features are provided. Additional information on UPT user identity authentication is provided in 4.4. Protection of third party mechanisms are specified in 4.6.

### 3.1 Essential UPT features

Essential UPT features are those features which are part of the basic operation of UPT and are therefore considered essential for UPT implementations. UPT enables the UPT user to use the following essential features.

**3.1.1 UPT user identity authentication:** A feature by which the UPT service provider verifies that the identity of the UPT user is the one claimed. It protects the UPT user and the UPT service provider against unauthorized and fraudulent use. This feature may be used in each UPT procedure. The authentication of the UPT user should not rely solely on something the UPT user possesses that could be used by a third party if stolen or lost. Refer to 4.4.2 “Authentication” for additional information.

**3.1.2 InCall registration:** A feature that enables the UPT user to register from the current terminal address for incoming calls to be presented to that terminal address. When registered, all incoming calls to the UPT number of the UPT user will be presented to the registered terminal address, for the duration specified by the UPT user (duration may also be specified in terms of number of incoming UPT calls), or until a specified deregistration time. A UPT user’s InCall registration will cancel the previous InCall registration of that UPT user’s UPT number. Several UPT users may register for incoming calls to the same terminal address simultaneously. The UPT user may also explicitly deregister for incoming calls.

**3.1.3 outgoing UPT call:** A feature by which the UPT user can initiate, from any terminal, an outgoing UPT call attempt. This feature requires the UPT user identity authentication feature for each outgoing UPT call attempt.

**3.1.4 InCall delivery:** A feature by which incoming calls are presented at the terminal address registered previously by InCall registration. This feature is invoked when originating parties or others call the UPT user.

### 3.2 Optional UPT features

Optional UPT features are additional UPT features that provide enhancements to the basic operation of the UPT service. UPT may enable access to the following optional features, limited by terminal and network capabilities and restrictions imposed by the network provider.

**3.2.1 remote InCall registration:** A feature by which a UPT user registers from any terminal address for incoming calls to be presented to any specified terminal address.

**3.2.2 OutCall registration:** A feature that enables the UPT user to register for outgoing calls from the current terminal address to allow outgoing calls to be made from that terminal address. When registered, upon accessing the UPT facilities, all outgoing UPT calls can be made from that terminal address for the duration specified by the UPT user (duration may also be specified in terms of number of outgoing UPT calls), or until a specified deregistration time. Outgoing UPT calls will be charged to the UPT subscriber.

Normally, the UPT user will not have to carry out any further authentication procedures in order to make outgoing calls. However, optionally a simplified authentication procedure may be used. A UPT user may register for outgoing calls to several terminal addresses simultaneously, but at any time only one UPT user/number may be registered for outgoing calls at the same terminal address. The UPT user may also explicitly deregister outgoing calls.

**3.2.3 remote OutCall registration:** A feature by which a UPT user registers, from any terminal address, for outgoing calls to be made from any other specified terminal address.

**3.2.4 OutCall follow-on:** A feature by which the UPT user, when terminating an outgoing UPT call, indicates that another outgoing UPT call is to follow, without the need for further authentication or the use of the global follow-on feature.

This option is recognized as being highly desirable.

**3.2.5 global follow-on:** A feature by which a UPT user, when terminating a UPT procedure (for which a successful authentication procedure has been carried out), indicates before disconnecting completely, a follow-on activity. This allows further UPT procedures without further authentication.

This option is recognized as being highly desirable.

**3.2.6 AllCall registration:** This feature enables the UPT user to make an InCall registration and an OutCall registration to the same terminal address using one single procedure. The effect of an AllCall registration is as if InCall and OutCall registration had been carried out separately. The duration of the registration (duration may also be specified in terms of number of incoming and/or outgoing UPT calls), or a specified deregistration time may be specified by the UPT user. The UPT user may also explicitly deregister AllCall. Unlike Linked registration (see 3.2.8), the UPT user can explicitly deregister the InCall registration or OutCall registration separately.

**3.2.7 remote AllCall registration:** This feature enables the UPT user to make a remote InCall registration and a remote OutCall registration to the same terminal address using one single procedure. The effect of a remote AllCall registration is as if remote InCall and remote OutCall registration had been carried out separately.

**3.2.8 linked registration:** As for the AllCall registration feature, the use of this feature combines the registrations for incoming and outgoing calls for the current terminal address in a single procedure. However, unlike AllCall registration, a Linked registration cannot be overridden in all or in part by:

- a) InCall, Remote InCall, AllCall or Remote AllCall registrations by the same UPT user;
- b) OutCall, Remote OutCall, AllCall, Remote AllCall, Linked or Remote Linked registrations by other UPT users.

The UPT user must explicitly deregister a Linked registration, or override it by another Linked or Remote Linked registration.

**3.2.9 remote Linked registration:** A feature by which a Linked registration for one specified terminal address can be carried out from another terminal address.

**3.2.10 UPT-specific indications:** A set of UPT-specific user-friendly standard announcements or indications (e.g. for support of specific charging arrangements) is provided.

**3.2.11 UPT service profile interrogation:** This feature enables the UPT user to interrogate (read only) the current status of the UPT user's own UPT service profile (e.g. for location information, availability of services etc.).

**3.2.12 UPT service profile modification:** This feature enables the UPT user to modify (read and write) the UPT user's own UPT service profile (e.g. for change of password, change of default UPT service profile parameters etc.).

**3.2.13 multiple terminal address registration:** This feature enables the UPT user to simultaneously register multiple terminal addresses for incoming and/or outgoing UPT calls.

**3.2.14 Call Pick Up:** A feature by which the UPT user answers an incoming UPT call at another terminal access, different from the terminal access (or accesses) specified by the InCall registration (for example, if the UPT user is alerted on a paging network). Call Pick Up always requires authentication when answering the call.

**3.2.15 variable default InCall registration:** A feature by which the UPT user sets up a default registration matrix of terminal addresses for incoming UPT calls, so that incoming UPT calls could be routed and handled differently (directed to a default address or cleared) according to time of day, day of week, calling party's identity, service type, the number dialed, and for "on no answer" and "on busy" conditions. This matrix can be modified by the UPT user. This feature would enable a UPT user with a regular travel routine or schedule to set up a "timetable" matrix.

**3.2.16 intended recipient identity presentation:** A feature by which the identity of the intended recipient (UPT number or name etc., specified by the called UPT user) is presented on the alerting terminal.

**3.2.17 access to groups of UPT service profiles:** This feature enables the UPT subscriber (or authorized UPT user) responsible for a group of UPT users, to access, create, interrogate and modify their UPT service profiles using UPT service profile management procedures.

**3.2.18 UPT service assistance:** A feature by which the UPT user can contact a UPT service center (e.g. an operator) to invoke UPT procedures in cases where automatic UPT procedures are unavailable or in cases of difficulty.

**3.2.19 called party specified secure answering of incoming UPT calls:** A feature by which the UPT user specifies that incoming UPT calls cannot be answered unless the answering party first successfully authenticates as the called UPT user.

**3.2.20 UPT service provider authentication:** A feature by which the UPT user can verify that the UPT service entity is the one claimed. With some authentication procedures, it will be provided automatically together with the user identity authentication. Refer to 4.4.2 "Authentication" for additional information.

**3.3 supplementary services in the UPT environment:** UPT supplementary services are parts of the UPT service offering, which are supplementary to the basic operation of UPT. This subject will be described in detail in future Recommendation F.853 "Supplementary Services in the Universal Personal Telecommunication (UPT) Environment".

## **4 UPT Service provisions**

### **4.1 Subscription**

Subscription to the UPT service satisfies the following requirements:

- a) The UPT service provider allocates UPT number(s) to the UPT subscriber. The UPT subscriber assigns UPT number(s) to UPT users. The UPT subscriber may also be the UPT user. The UPT user could have more than one UPT number.

- b) The UPT service provider offers the range of available telecommunication services from which the subscriber may define the personal requirements which will form the basis for the UPT user's personal UPT service profile.
- c) The UPT user will be advised of standard means for UPT access and authentication.

In order to make use of telecommunication services in the flexible ways enabled by UPT, a specific subscription to a UPT service provider is required. The method of subscription is a national matter.

It is desirable that access to all national and international UPT facilities be obtainable by subscribing to one UPT service provider. The UPT subscriber may request several subscription options, such as:

- a) basic telecommunication services included with the UPT subscription;
- b) supplementary services applied to each basic telecommunication service;
- c) roaming restrictions applied to each telecommunication service;
- d) confidentiality of the UPT user's private information (such as the UPT user's general location).

The UPT subscriber may request the withdrawal of the UPT subscription. Conditions under which the UPT service provider may withdraw the UPT subscription are a national matter.

## **4.2 Service aspects of numbering and dialling**

UPT numbering is discussed in Recommendation E.168 "Application of E.164 Numbering Plan for UPT". Recommendation E.168 discusses UPT number structure and its relationship to network numbers to support personal mobility. Three UPT numbering scenarios are introduced in Recommendation E.168 to address UPT short-term and long-term UPT numbering service aspects. In general from the UPT user's point of view, it is desirable that UPT numbering support the following UPT service aspects.<sup>1)</sup>

### **4.2.1 UPT number structure**

- a) The UPT number structure be such that the UPT number is easily recognized and distinguished from ordinary (non-UPT) numbers by users and potential calling parties.  
This enables calling parties to know or infer that the call might be charged in a special manner, handled in a different manner, dialled in a different manner, dialled with additional options, etc.
- b) If there is some form of UPT prefix (a number, a calling party must dial before dialling a UPT number) it be the same (or similar) across national and international boundaries, amongst UPT service providers, and across networks.
- c) The UPT number be as short as practicable in order to minimize the number of digits a calling party must dial.
- d) The UPT number be diallable and routable from any terminal.
- e) UPT subscribers be able to retain their UPT number(s) whenever they change service provider.
- f) In the long term, the UPT number be usable across all networks, all terminals, and using any service.
- g) The evolution of the UPT numbering plan should minimize the changes to UPT numbers.

### **4.2.2 UPT access code**

- a) The UPT access code (which may be used for entering the UPT environment), be the same across national and international boundaries, amongst service providers, and across networks. Although a single UPT access code would be desirable, UPT access codes may vary between networks and geographical areas.
- b) The UPT access code(s) (if any) be as short as practicable.

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<sup>1)</sup> ITU-T-Recommendations on UPT numbering and dialling are developed by ITU-T Study Group 2. The degree of preference of the various numbering and dialling service aspects may need to be reviewed after advice from ITU-T Study Group 2.

### 4.2.3 UPT number representation

- a) The representation of a UPT number, whenever it appears in human readable form (e.g. business cards, letterheads or directories), should be easily recognized and distinguished from ordinary (non-UPT) numbers by users and potential calling parties. For example, a special symbol could be prefixed to the number, similar to the “+” symbol used to designate international numbers.
- b) The default charging reference location of the UPT user may need to be indicated to users and potential calling parties.

## 4.3 Charging aspects

### 4.3.1 User-perspective aspects

In general from the UPT user’s point of view, it is desirable that billing and charging in a UPT environment support the following UPT-specific service aspects:<sup>2)</sup>

- a) The UPT subscriber be billed by one UPT service provider. Other billing methods may still be used to allow the UPT user to direct a particular charge to a particular billing address, e.g. a charge card.
- b) The UPT user's UPT number to provide the effective billing identification.
- c) The UPT subscriber's billing account be associated with the UPT user’s UPT number.
- d) Charging be based on a unique UPT user identification.
- e) For a call to a UPT user who has roamed, the calling party be given sufficient information so as to make a decision to continue or terminate the call set-up when there would be a higher-than-expected call charge rate.
- f) UPT charges be understandable by the calling party and the UPT subscriber.
- g) To the extent practicable, the charging options (e.g., reverse charge service) available to a non-UPT call originator should not be restricted in a call to a UPT user.
- h) Flexible charging options be made available to UPT subscribers to suit their various requirements, for example temporarily changing the charging reference location.
- i) UPT subscribers’ bills be accurate and rendered in a timely manner.
- j) The UPT user has protection against unexpected charges for both incoming and outgoing calls. For example, through the provision of advice of charge rate information.
- k) Charging procedures similar to the telephone service should apply to the calling party if the call to the UPT user is not successful (e.g. no answer, busy, etc.).

### 4.3.2 Operational aspects

The capabilities enabled by UPT, may result in UPT-specific charging aspects, for example:

- a) The charging elements may not be limited to telecommunication service usage charges, but may include, for example, elements for location and personal UPT service profile management.
- b) Service provision may result in split charges between the calling and called parties.

## 4.4 Security

Generally in the field of telecommunication, users may be exposed to various forms of misuse, for example in the case of UPT:

- a) Fraudulent use of a UPT user’s resources by unauthorized parties who manage to take up the identity of the user.
- b) Eavesdropping or unauthorized tapping of information exchanged during communication. This could result in unauthorized disclosure of the UPT user’s identity (carried for example in signalling messages), and therefore violating the confidentiality of the UPT user’s identity.

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<sup>2)</sup> ITU-T-Recommendations on UPT charging and billing are developed by ITU-T Study Group 3.

- c) Eavesdropping or unauthorized tapping of information in the UPT user's service profile.
- d) Disclosure of the user's physical location during normal UPT call procedures (e.g. through use of identification supplementary services).

#### 4.4.1 General security requirements

The introduction of UPT and the powerful communication capabilities enabled by it, necessitate that various security mechanisms be made available to affected users. The security levels afforded by these mechanisms depend on various factors:

- a) The particular security mechanisms of choice;
- b) the choice of UPT terminals;
- c) the actual use of the UPT procedures;
- d) the choice of access and authentication procedures.

It is noted that some security mechanisms appear as integral parts of certain UPT procedures. It is in general desirable that all security mechanisms supported by the UPT service be simple to use and appear as part of the general UPT procedures (e.g. using optional authentication when answering incoming calls).

It is desirable that a range of security levels be supported by UPT service providers. These would be offered to UPT users to choose from at subscription time.

The security level offered to the UPT user, depends heavily on the choice of the degree of authentication.

#### 4.4.2 Authentication

A choice of various options of authentication mechanisms may be supported by UPT service providers, for use by UPT users. Annex A presents authentication levels and provides some examples of how UPT user identity authentication could be realized. Annex A also presents the service requirements for an optional means of providing a relatively strong form of UPT user identity authentication in UPT Service Set 1.

##### 4.4.2.1 Degrees of authentication

The degree of authentication (stronger or weaker) depends on the authentication method used. The degree of authentication used should be sufficient to abate the anticipated security risks. Examples of security risks include:

- 1) *Fraudulent duplication of key personal information by a third party* – In this regard, numerical identity (e.g. a personal identification number or PIN) is considered a weak form of authentication, while an individual physical feature (e.g. voiceprint) is considered a strong authentication feature.
- 2) *Eavesdropping by a third party during authentication procedures* – In this regard, the weakest authentication procedure is to directly send the required key personal information over the available communication channel. Stronger authentication levels may be achieved, for example, by using various encryption methods.

In general, authentication should also be strong enough to guarantee a sufficient level of security when UPT services are accessed through UPT-supporting networks visited by UPT users. The authentication procedure to be adopted may be negotiated between the UPT service provider and the visited networks. UPT users and UPT service providers have the options to support various authentication mechanisms to meet the required degree of authentication.

##### 4.4.2.2 Types of authentication

UPT authentication procedures can be classified into several types, including:

- a) One-way with a fixed Personal Identification Number (PIN):  
In this case, the authentication procedure is completed by sending the correct PIN by the UPT user.
- b) One-way with variable authentication codes:  
In this case, the authentication procedure still uses one-way transmission, but with a variable authentication code.

- c) Two-way with variable authentication codes:

In this case, the authentication procedure employs two-way transmission in a challenge-response mode.

As mentioned earlier in 4.4.2, Annex A discusses UPT user identity authentication levels and realizations.

## **4.5 UPT service profiles**

The information contained in the UPT user's service profile needs to be updated according to the UPT user needs and requests. At the same time, the data contained in a UPT user's service profile needs adequate protection against unauthorized access and modification.

### **4.5.1 Structure of the UPT service profile**

The UPT subscriber will, at subscription time, set up a matrix of authorized actions in the UPT service profile (e.g. access parameters for service management procedures, interrogation or modification and a list of services and facilities actually subscribed to).

Information stored in the UPT service profile may be divided into two general categories: fixed information and variable information. The fixed information is typically agreed to (with the UPT service provider) at subscription time and can, in part, be changed only by the UPT subscriber, while only the variable information can be changed by the UPT user.

Division of UPT service profile information into categories, and the type of information in each category are UPT service provider options. Service profile information is stored in the service provider's database.

#### **4.5.1.1 Fixed service profile information**

Fixed service profile information can be classified into:

- a) Information agreed to at subscription time, managed only by the UPT service provider. If allowed by the UPT service provider, this information could however be displayed to UPT users and UPT subscribers. Changes to this information may be requested by the UPT subscriber, administrative procedures must be used to allow the UPT service provider to set up a new UPT subscription.
- b) Information changeable by the UPT subscriber. Restrictions by the UPT subscriber may not allow the UPT user to modify this information.

Fixed information under service provider control include:

- 1) UPT number;
- 2) default charging reference location of the UPT user;
- 3) services subscribed to, by the UPT subscriber;
- 4) maximum number of failed authentication attempts, before disabling access to the UPT service profile;
- 5) authentication procedures subscribed to;
- 6) security options subscribed to.

Typical information that can be modified by the UPT subscriber, either directly or, indirectly include:

- 1) charging option(s) selected;
- 2) UPT service profile access parameters (read and write restrictions) for the UPT user;
- 3) the maximum allowed credit for the UPT user (threshold of credit);
- 4) restrictions on roaming, if any;
- 5) maximum number of terminal addresses for group registration for incoming calls.

If allowed by the UPT subscriber, information under UPT subscriber control, may be displayed to the UPT users.

#### **4.5.1.2 Variable service profile information**

Variable information stored in the UPT service profile is divided into service-related information and mobility-related information, and can be changed by the UPT user (or the UPT subscriber) using:

- a) UPT service profile modification procedures for service-related parameters; or
- b) personal mobility procedures for mobility-related parameters.

Typical service-related parameters changeable by the UPT user or the UPT subscriber, using the UPT service profile modification features include:

- 1) type of authentication procedures activated;
- 2) restrictions on permitted calling parties;
- 3) activation status for each supplementary service.

Typical mobility-related parameters changeable by the UPT user or the UPT subscriber, using various UPT registration features (e.g. InCall and OutCall) include:

- 1) current terminal addresses for incoming calls;
- 2) current terminal addresses for outgoing calls;
- 3) a Linked-registered terminal address;
- 4) necessity of UPT user identity authentication for answering incoming UPT calls.

Typical mobility-related parameters changeable by the UPT user or the UPT subscriber, using various UPT service profile modification features include:

- 1) temporary charging reference location;
- 2) default terminal addresses for incoming calls;
- 3) default terminal addresses for outgoing calls;
- 4) default duration (or number of calls) for incoming calls' registration;
- 5) variable routing parameters, such as:
  - routing by call originating area;
  - routing by calling party identity (if applicable);
  - time-dependent routing (by day of week, by day of year, by time of day, etc.);
  - routing by "on busy" condition;
  - routing on "no answer" condition.

#### **4.5.2 UPT service profile access**

There are certain restrictions on UPT service profile access for interrogation or modification (see the descriptions of these optional features in 3.2). The level of restriction varies by UPT service provider, UPT subscriber or UPT user. The degrees of access to a UPT service profile vary between:

- a) no access;
- b) interrogate access (read only); or
- c) modify access (read and write).

##### **4.5.2.1 Service profile access by UPT service providers**

The UPT service provider may access all the information contained in a user's UPT service profile without restrictions.

##### **4.5.2.2 Service profile access by UPT subscribers**

The type of access permitted to both, the UPT subscriber and the eventual UPT users associated with the subscriber is agreed with the UPT service provider at subscription time. The UPT subscriber can access only the information negotiated with the UPT service provider. Parts of this information can only be read, but not modified (e.g. the UPT number).

Modifications to the access restrictions agreed at subscription time between the UPT service provider and UPT subscriber can only be made by arrangements with the UPT service provider via administrative procedures.

##### **4.5.2.3 Service profile access by UPT users**

The UPT user can have access to his or her own UPT service profile if authorized by the UPT subscriber. Additional restrictions on UPT user access to his or her own service profile may be applied by the associated subscriber.

## **4.6 Protection of third parties**

UPT provides personal mobility to UPT users by allowing them to register for incoming or outgoing UPT calls to a terminal of their choice. UPT users may borrow existing and available terminals and subscriber lines for their temporary use, while temporarily taking over any charges associated with those terminals and subscriber lines. In principle, such temporary “ownership” could conflict with the needs of the terminal owners or line subscribers.

### **4.6.1 General requirements**

Third parties (e.g. terminal owners or line subscribers) should in principle, not suffer in terms of privacy or freedom of actions, as a result of UPT activities by UPT users. In addition, the introduction of UPT or the activities of any UPT user should in no way harm the serving network or degrade the quality of service of non-UPT services.

### **4.6.2 Specific privacy requirements**

#### **4.6.2.1 Protection against unwanted incoming UPT calls**

The subscriber of a terminal address may want to restrict incoming UPT calls to this terminal address in order to avoid incoming UPT calls at the terminal to UPT users.

#### **4.6.2.2 Protection against malicious OutCall registrations**

A malicious UPT user could use an OutCall registration (or remote OutCall registration), to log activities of an ordinary (non-UPT) subscriber. A subscriber who owns a particular terminal address may want to restrict, or be aware of OutCall registrations to their terminal address.

### **4.6.3 UPT mechanisms provided for third parties (for further study)**

Restrictions on registrations, for incoming and outgoing UPT calls, may be used to prevent UPT users from registering, intentionally or unintentionally, to terminal addresses owned by third parties.

#### **4.6.3.1 Essential mechanisms**

None identified.

#### **4.6.3.2 Optional mechanisms**

##### **4.6.3.2.1 Indications of UPT registrations**

Indications of UPT registrations should, when practicable, be given to the user of a terminal when the terminal has a registration for incoming and/or outgoing UPT calls. The type of indications will depend on network and terminal capabilities.

##### **4.6.3.2.2 Reset of registrations for incoming UPT calls**

This mechanism provides means for a third party to explicitly reset all UPT users who may have registered for incoming UPT calls to a terminal address.

##### **4.6.3.2.3 Blocking/deblocking of registrations for incoming UPT calls**

This mechanism provides means for third parties to prohibit UPT users from registering for incoming calls to a specific terminal address.

##### **4.6.3.2.4 Blocking/deblocking of incoming UPT calls**

This mechanism provides means for third parties to block all incoming UPT calls to a specific terminal address.

##### **4.6.3.2.5 Reset of registration for outgoing UPT calls**

This mechanism provides means for third parties to explicitly reset the UPT user who has registered for outgoing calls to a specific terminal address.

#### 4.6.3.2.6 Suspension of registration for outgoing UPT calls

This mechanism provides means for third parties to temporarily suspend a UPT user's registration for outgoing UPT calls to a specific terminal address.

## 5 UPT functional procedures

This clause gives a general description of the various UPT procedures to support the UPT features described in clause 3. It describes the UPT procedures as seen by the UPT user (or any other user in terms of possible interactions with the UPT service). No restrictions on network implementation or man-machine interfaces are intended. For example, OutCall registration and Remote OutCall registration (see 3.2) could be combined as one user procedure.

UPT functional procedures are classified into five different categories:

a) *Elementary procedures*

Elementary UPT procedures are procedures that are carried out either before, or in conjunction with other UPT procedures. The following elementary UPT procedures are identified:

- 1) access;
- 2) identification;
- 3) authentication;
- 4) global follow-on;
- 5) outCall follow-on.

b) *Personal mobility procedures*

Personal mobility procedures are UPT procedures relating to the personal mobility of the UPT user and require access, identification and authentication procedures to be carried out with or before these procedures. Personal mobility procedures are registration procedures used to specify where to receive or make calls and do not include the actual receiving or making of calls. The following is a list of personal mobility procedures:

- 1) InCall registration;
- 2) InCall deregistration;
- 3) OutCall registration;
- 4) OutCall deregistration;
- 5) AllCall registration;
- 6) AllCall deregistration;
- 7) Linked registration;
- 8) Linked deregistration.

c) *UPT call handling procedures*

UPT call handling procedures are procedures relating to the actual receiving and making of calls and may require access, identification and authentication procedures to be carried out with or before these procedures. The UPT call handling procedures are:

- 1) outgoing UPT call;
- 2) alerting for incoming UPT calls;
- 3) answering of incoming UPT calls.

d) *UPT service profile management procedures*

UPT service profile management procedures allow the UPT user to manage accessible data in their own personal service profile, and require access, identification and authentication procedures to be carried out before or as part of these procedures. Two procedures are possible:

- 1) profile Interrogation;
- 2) profile Modification.

e) *Third party protection procedures* (for further study)

Third party protection procedures are intended for the protection and privacy of third parties. They are intended to be carried out by third parties, UPT or non-UPT. They are:

- 1) reset of registrations for incoming UPT calls;
- 2) blocking of registrations for incoming calls;
- 3) deblocking of registrations for incoming calls;
- 4) blocking of incoming UPT calls;
- 5) deblocking of incoming UPT calls;
- 6) reset of registrations for outgoing UPT calls;
- 7) suspension of registrations for outgoing UPT calls.

In all the UPT procedures some information needs to be provided by the UPT user, of which some 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 provided on a case-by-case basis.

## **5.1 Elementary procedures**

Elementary UPT procedures are procedures that have no significance on their own. These procedures are always carried out in conjunction with other UPT procedures (e.g. call handling or personal mobility).

### **5.1.1 Access**

An access procedure may be required before a UPT procedure can be carried out.

### **5.1.2 Identification**

This procedure is carried out by the UPT user to identify himself or herself to the UPT service provider. This identification procedure may be required before, or as a part of, other UPT procedures. Identification information (e.g. UPT number) will be required.

### **5.1.3 Authentication**

The authentication procedure is used by the UPT service provider to ensure that the calling party or answering party has the correct UPT user identity claimed.

The authentication procedures may be required before, or as part of, other UPT procedures. The identification procedures may be required before, or as a part of the authentication procedures. Some information is mandatory and must be provided by the UPT user. A choice of authentication procedures may be available dependent on the degree of authentication required. For further information, refer to 4.4.2.

### **5.1.4 Global follow-on**

The global follow-on procedure is used by the UPT user to terminate the current UPT procedure, and follow it by a new UPT procedure without having to repeat the identification and authentication procedures.

To carry out the global follow-on procedure, the mandatory information required from the UPT user, is the new UPT procedure type only.

### **5.1.5 OutCall follow-on**

The OutCall follow-on procedure is used by the UPT user when terminating an outgoing UPT call, in order to follow it by a new outgoing UPT call before disconnecting completely. With this procedure, there is no need to repeat the identification and authentication procedures or use the global follow-on procedure.

To carry out the OutCall follow-on procedure, the mandatory information required from the UPT user is the request for a new outgoing UPT call.

## **5.2 Personal mobility procedures**

Personal mobility procedures are UPT procedures relating to the personal mobility of the UPT user, and are intended to allow the UPT user to make or receive calls. Personal mobility procedures do not involve the actual making or receiving of calls.

### 5.2.1 InCall registration

InCall registration provides means for a UPT user to indicate where incoming UPT calls shall be presented. Such a registration will override any previous registration. An InCall registration procedure may also be carried out as part of an AllCall registration procedure.

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

The UPT user may be expected to obtain agreement of the owner of the particular terminal address to which InCall registration is intended.

During this procedure, the UPT user must provide certain mandatory information and may provide additional optional information as follows:

- a) *Mandatory information* – UPT procedure type.
- b) *Optional information includes:*
  - 1) An indication of whether-or-not answering of incoming UPT calls shall require authentication. The default condition will be specified in the UPT user's service profile.
  - 2) The duration of the registration, if needed. This may also be specified in terms of number of incoming UPT calls. The default condition will be specified in the UPT user's service profile.
  - 3) An indication of group registration, if needed. If no indication is given, registration of a single terminal address is assumed.
  - 4) One or more terminal addresses, if needed (e.g. if the user chooses to specify a terminal address other than the one currently used, or for group registration). Each of these terminal addresses may be restricted to call answering and/or call alerting. If no address is specified, the address of the used terminal is assumed.

Each terminal address can be either a complete access address or a pointer to one of a number of pre-selected access addresses for InCall registrations, stored in the UPT service profile.

- 5) An indication of the telecommunication services to which the registration applies, if needed. If no service is specified, the default services for InCall registrations, indicated in the UPT service profile, are assumed.
- 6) An indication of any special conditions to be placed on the registration, if needed (e.g. a list of permitted calling parties).

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. This procedure could be terminated for example due to lack of correct authentication or due to UPT service profile restrictions.

### 5.2.2 InCall deregistration

An InCall registration may be cancelled in one of the following ways:

- a) The UPT user can explicitly deregister.
- b) The UPT user can register to another terminal, causing the previous registration to be overridden.
- c) The UPT service provider can specifically deregister the UPT user to terminate the registration.
- d) Other users (UPT or non-UPT), may deregister the UPT user to terminate the registration to a specific terminal address (for further study).
- e) By timer or counter expiry.

The following procedures apply to items a) and b) above. The procedures for item d) are shown in 5.5.1.

When an InCall registration has been deregistered, except when by explicit override, the presentation of incoming calls will go to an appropriate default terminal address defined in the UPT service profile. Examples of default terminal addresses are a mailbox, a paging network or "no terminal address". Unless "no terminal address" is specified, the UPT user will never be completely deregistered for incoming calls.

UPT access, identification and authentication procedures must have been successfully completed before, or as part of, this procedure. During this procedure, the UPT user must provide certain mandatory information and may provide additional optional information as follows:

- a) *Mandatory information* – UPT procedure type.
- b) *Optional information includes:*
  - 1) An indication of group deregistration, if needed. If no indication is given, deregistration of a single terminal address is assumed.
  - 2) One or more terminal addresses, if needed (e.g. if the user chooses to specify a terminal address other than the one he is currently using, or for group deregistration). If no address is specified, the address of the used terminal address is assumed. The address could also indicate all terminal access terminal addresses registered for incoming UPT calls.

Each terminal address can be either a complete access address or a pointer to one of a number of pre-selected access addresses for InCall registrations, stored in the UPT service profile.

- 3) An indication of the telecommunication services to which the deregistration applies, if needed. If no service is specified, all services for 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. This procedure could be terminated due to lack of correct authentication or incorrect terminal address.

### **5.2.3 OutCall registration**

A UPT user may register for outgoing calls to a terminal address to initiate a session, using the OutCall registration procedure. During the session, no additional authentication is normally required from the UPT user in order to make subsequent outgoing calls. The terminal address registered to, is personalized for the user, and all outgoing calls from that terminal address will be charged to the UPT number of that UPT user. Only one UPT user/number may be registered for outgoing calls to a specific terminal address at the time. An OutCall registration procedure may also be carried out as part of an AllCall registration procedure.

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

The UPT user may be expected to obtain agreement of the owner of the particular terminal address to which OutCall registration is intended.

During this procedure, the UPT user must provide certain mandatory information and may provide additional optional information as follows:

- a) *Mandatory information* – UPT procedure type.
- b) *Optional information includes:*
  - 1) An indication of group registration, if needed. If no indication is given, registration of a single terminal address is assumed.
  - 2) One or more terminal addresses, if needed (e.g. if the user chooses to specify another terminal address than the one he is currently using, or for group registration). If no address is specified, the address of the used terminal address is assumed.

Each terminal address can be either a complete access address or a pointer to one of a number of pre-selected access addresses for OutCall registrations, stored in the UPT service profile.

- 3) An indication of the telecommunication services to which the registration applies, if needed. If no service is specified, the default services for OutCall registrations, indicated in the UPT service profile, are assumed.
- 4) The duration of the registration, if needed. This may also be specified in terms of number of outgoing calls.

- 5) An indication of whether or not additional authentication (e.g. a PIN code) is required at each call setup. If no indication is given, no additional authentication will be required.
- 6) An indication of whether or not any other UPT users shall be allowed to deregister the UPT user for outgoing calls from a terminal address by override.

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. This procedure could be terminated for example due to lack of correct authentication or due to UPT service profile restrictions.

Specifically, this registration procedure will be terminated if another user has already registered for outgoing calls to the terminal address specified (without permitting override).

#### **5.2.4 OutCall deregistration**

An OutCall registration may be cancelled in one of 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 may be given in the UPT user's OutCall registration, another UPT user may register for outgoing calls to the same terminal address, thus causing the previous registration to be cancelled (by override).

When all OutCall registrations have been deregistered, the registration will fall back to either the default terminal addresses for outgoing call registration or to the "no terminal address" as specified in the UPT service profile. Unless "no terminal address" is specified, the UPT user will never be completely deregistered for outgoing calls.

UPT access, identification and authentication procedures must have been successfully completed before, or as a part of, this procedure.

During this procedure, the UPT user must provide certain mandatory information and may provide additional optional information as follows:

- a) *Mandatory information* – UPT procedure type.
- b) *Optional information includes:*
  - 1) An indication of group deregistration, if needed. If no indication is given, deregistration of a single terminal address is assumed.
  - 2) One or more terminal addresses, if needed (i.e. if the user chooses to specify a terminal address other than the one he is currently using, or for group deregistration). The address could also indicate all terminal addresses registered for outgoing UPT calls. If no address is specified, the address of the used terminal is assumed.

Each terminal address can be either a complete access address or a pointer to one of a number of pre-selected access addresses for OutCall registrations, stored in the UPT service profile.

- 3) An indication of the telecommunications 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 registration is accepted or give an appropriate announcement if not, and the procedure is terminated. This procedure could be terminated for example due to lack of correct authentication or due to UPT service profile restrictions.

### 5.2.5 AllCall registration

The InCall and OutCall registration procedures may be combined into a single user procedure, an AllCall registration procedure. Only one set of authentication parameters are necessary for 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 address. Except for the authentication parameters, the input parameters and network responses seen by the UPT user would be exactly as if separate procedures were used.

### 5.2.6 AllCall deregistration

In the same manner as for AllCall registration, an AllCall deregistration procedure may also be used to deregister an InCall and an OutCall registration for the same terminal address in one operation. Where an AllCall deregistration is performed for a terminal where only an InCall is active, InCall deregistration takes place and OutCall deregistration is rejected. Similarly, when an AllCall deregistration is performed for a terminal where only an OutCall is active, OutCall deregistration takes place and InCall deregistration is rejected.

### 5.2.7 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 address. A Linked registration can only be changed by another Linked registration (by override) or by a Linked deregistration procedure. During a Linked registration session, no additional authentication is normally required from the UPT user in order to make subsequent outgoing calls or receive incoming UPT calls. Only one UPT user/number may have a Linked registration to a specific terminal address at the same time and only one terminal address can be part of a Linked registration. A Linked registration to a terminal address will further preclude any other registration to that terminal address, except InCall registrations by other UPT users or by the UPT user with another UPT number.

UPT access, identification and authentication procedures must have been successfully completed before, or as a part of, this procedure. During this procedure, the UPT user must provide certain mandatory information and may provide additional optional information as follows:

- a) *Mandatory information* – UPT procedure type.
- b) *Optional information includes:*
  - 1) The duration of the registration, if needed. This may also be specified in terms of number of incoming and/or outgoing calls.
  - 2) The terminal address, if needed (i.e. if the user chooses to specify a terminal address other than the one he is currently using). If no address is specified, the address of the used terminal address is assumed.  
  
The terminal address can be either a complete access address or a pointer to one of a number of pre-selected access addresses for Linked registrations, stored in the UPT service profile.
  - 3) 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.
  - 4) An indication of any special conditions to be placed on the registration, if needed (e.g. a list of permitted calling parties).
  - 5) An indication of whether or not additional authentication will be required for each setup (e.g. PIN code).

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. This procedure could be terminated for example due to lack of correct authentication or due to UPT service profile restrictions. Specifically, Linked registration will be terminated if another UPT user has already registered for outgoing calls to the requested terminal address (without permitting override).

### 5.2.8 Linked deregistration

A Linked registration may be cancelled in one of the following ways:

- a) The UPT user can specifically deregister.
- b) The UPT user can perform a Linked registration to another terminal address with the same UPT number, thus causing the previous registration to be overridden.
- c) The UPT service provider can specifically deregister the UPT user to terminate the session.
- d) By timer or counter expiry.

When a Linked registration has been deregistered, except when by explicit override, the registration will be completely deregistered to “no terminal address”.

UPT access, identification and authentication procedures must have been successfully completed before, or as a part of, this procedure.

During this procedure, the UPT user must provide certain mandatory information and may provide additional optional information as follows:

- a) *Mandatory information* – UPT procedure type.
- b) *Optional information includes:*
  - 1) The terminal address, if needed (i.e. if the user chooses to specify a terminal address other than the one he is currently using). If no address is specified, the address of the used terminal address is assumed.  
  
The terminal address can be either a complete access address or a pointer to one of a number of pre-selected access addresses for Linked registrations, stored in the UPT service profile.
  - 2) 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. This procedure could be terminated for example due to lack of correct authentication or due to UPT service profile restrictions.

## 5.3 UPT call handling procedures

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

### 5.3.1 Outgoing UPT call

This procedure may be used by a UPT user in order to make an outgoing UPT call, independent of any previous InCall or OutCall registrations by the same UPT user or other UPT users on the same terminal address. No personal mobility state of any UPT user is affected by this procedure. The outgoing UPT call is charged to the UPT number.

UPT access, identification and authentication procedures must have been successfully completed as a part of this procedure. During this procedure, the UPT user must provide certain mandatory information and may provide additional optional information as follows:

- a) *Mandatory information*
  - UPT procedure type;
  - called party address.
- b) No optional information is needed.

The network will indicate to the UPT user if the outgoing UPT call is not accepted. This procedure could be terminated for example due to lack of correct authentication.

### 5.3.2 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 for a UPT user who has registered for incoming calls beforehand.

The network performs an alerting for incoming calls on the terminal address, or a paging network, given by the UPT user's registration for incoming calls.

If the UPT user has a registration for incoming calls indicating "no terminal address", the calling party will receive an appropriate announcement indicating "UPT user currently not reachable".

This 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 provided by the UPT user.

Alerting for incoming UPT calls in the case of Multiple Terminal Address registration (see 3.2.13) is for further study. In this case, two scenarios are possible:

- all terminals are alerted in parallel;
- all terminals are alerted in sequence.

### 5.3.3 Answering of incoming UPT calls

Having registered for incoming calls, this procedure is used by the UPT user to answer incoming UPT calls indicated by the "Alerting for incoming UPT calls" procedure. When the "Answering of incoming UPT calls" procedure is successfully completed, call completion can proceed in the normal way.

When alerted by the "Alerting for incoming calls" procedure, the UPT user answers this alerting on the terminal of choice, as determined by registration for incoming calls. If the UPT user is registered for incoming calls on a paging network, any terminal may be used.

Except for the cases below, for answering incoming UPT call, no procedures are required by the UPT service and anyone (including non-UPT user) is able to answer the alerting.

- a) If authentication of answering UPT user is required by the registration for incoming calls, authentication procedures must be successfully completed before, or as a part of, this procedure.
- b) If the UPT user answers the alerting on another terminal different from the terminal address specified by the registration for incoming calls (i.e., Call Pick Up), UPT access identification and authentication procedures must be successfully completed before, or as part of, this procedure.

During this procedure, only in the case of answering at another terminal address, the UPT user must provide certain mandatory information and may provide additional optional information as follows:

- a) *Mandatory information* – UPT procedure type.
- b) 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. This procedure could be terminated due to lack of correct authentication or due to UPT service profile restrictions.

## 5.4 UPT service profile management procedures

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

### 5.4.1 UPT service profile interrogation

This procedure allows the UPT user to obtain information on the current status of the UPT user's own service profile. UPT identification and authentication procedures must have been successfully completed before, or as part of, this procedure.

During this procedure, the UPT user must provide certain mandatory information and may provide additional optional information as follows:

- a) *Mandatory information* – UPT procedure type.
- b) *Optional information includes:*

Information concerning the type of UPT service profile information to be read. Such information may include, telecommunication services subscribed to, default parameters, activated supplementary services, or current registrations for incoming or outgoing calls.

The network will respond with the required information, unless the procedure is terminated for example, due to lack of correct authentication or due to UPT service profile restrictions.

#### **5.4.2 UPT service profile modification**

The UPT service profile modification procedure allows the UPT user to change appropriate UPT service profile parameters. UPT identification and authentication procedures must have been successfully completed before, or as part of, this procedure.

During this procedure, the UPT user must provide certain mandatory information and may provide additional optional information as follows:

- a) *Mandatory information* – UPT procedure type.
- b) *Optional information includes:*

Information concerning the type of UPT service profile information to be modified. Such information could concern activation or deactivation of supplementary services or changes to various default parameters.

As described in 4.5 under service profile modification, certain restrictions apply to, both UPT users and UPT subscribers.

The network will indicate to the UPT user if the modification request is accepted or give an appropriate announcement if not, and the procedure is terminated. This procedure could be terminated due to lack of correct authentication or due to UPT service profile restrictions.

### **5.5 Third party protection procedures (for further study)**

These procedures are intended for the protection of the privacy, integrity and security of third parties (e.g. the owner of a particular terminal address). These procedures are intended to be carried out by third parties. Therefore, third party identification and authentication may optionally be required to prevent undesired actions by unauthorized third parties.

#### **5.5.1 Reset of registrations for incoming UPT calls**

Reset of registrations for incoming UPT calls provides means for a third party to explicitly deregister all UPT users who may have registered for incoming UPT calls to the terminal address owned by the third party. This procedure cancels all registrations for incoming UPT calls to this specific terminal address.

During this procedure, the UPT user must provide certain mandatory information and may provide additional optional information as follows:

- a) *Mandatory information* – UPT procedure type.
- b) No optional information is needed.

The address of the terminal in use will be assumed for the reset. Reset from a remote terminal is not allowed.

In case a registration for incoming UPT calls to the terminal address is part of a group registration, the effect should be as if this group registration has been cancelled.

A UPT user whose registration has been reset in this manner, will have his or her incoming calls directed to the default terminal address 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. This procedure could be terminated due to lack of correct authentication or due to UPT service profile restrictions.

### **5.5.2 Blocking of registrations for incoming UPT calls**

Blocking of registrations for incoming UPT calls provides means for third parties to prohibit UPT users from registering for incoming calls to a specific terminal address. When this procedure has been carried out, any attempts by UPT users to register for incoming UPT calls to the terminal address will be rejected. The network could optionally allow the duration of blocking to be specified.

During this procedure, the UPT user must provide certain mandatory information and may provide additional optional information as follows:

- a) *Mandatory information* – UPT procedure type.
- b) No optional information is needed.

The address of the terminal in use is assumed for the blocking. Blocking of registrations from a remote terminal is therefore 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.

### **5.5.3 Deblocking of registrations for incoming UPT calls**

Deblocking of registrations for incoming UPT calls provides means for third parties to open a terminal address 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 address. The network could optionally allow the duration of deblocking to be specified.

During this procedure, the UPT user must provide certain mandatory information and may provide additional optional information as follows:

- a) *Mandatory information* – UPT procedure type.
- b) No optional information is needed.

The address of the terminal in use, is assumed for the deblocking. Deblocking of registrations from a remote terminal is therefore not allowed.

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

### **5.5.4 Blocking of incoming UPT calls**

Blocking of incoming UPT calls provides means for third parties to block all incoming UPT calls to a specific terminal address. When this procedure has been carried out, any incoming UPT calls will be rejected, even if a successful registration for incoming calls has been carried out by a UPT user, and an announcement will be given to the calling users to this effect.

During this procedure, the UPT user must provide certain mandatory information and may provide additional optional information as follows:

- a) *Mandatory information* – UPT procedure type.
- b) No optional information is needed.

The address of the terminal in use is assumed for the blocking. Blocking of incoming UPT calls from a remote terminal is therefore 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.

### **5.5.5 Deblocking of incoming UPT calls**

Deblocking of incoming UPT calls provides means for third parties to open a terminal address for subsequent incoming UPT calls. When this procedure has been carried out, any UPT user registered for incoming UPT calls to the terminal address may receive incoming calls.

During this procedure, the UPT user must provide certain mandatory information and may provide additional optional information as follows:

- a) *Mandatory information* – UPT procedure type.
- b) No optional information is needed.

The address of the terminal in use is assumed for the deblocking. Deblocking of incoming UPT calls from a remote terminal is therefore 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.

### **5.5.6 Reset of registration for outgoing UPT calls**

The reset of registration for outgoing UPT calls provides means for third parties to explicitly deregister the UPT user who has registered for outgoing calls to a specific terminal address.

During this procedure, the UPT user must provide certain mandatory information and may provide additional optional information as follows:

- a) *Mandatory information* – UPT procedure type.
- b) No optional information is needed.

The address of the terminal in use is assumed for the reset. Reset of registrations from a remote terminal is therefore not allowed.

In case the registration for outgoing UPT calls to the used terminal address was part of a group registration, only the used terminal address in question will 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. This procedure could be terminated for example due to lack of correct third-party authentication.

### **5.5.7 Suspension of registration for outgoing UPT calls**

The suspension of registration for outgoing UPT calls provides means for third parties to temporarily override a registration for outgoing UPT calls to a specific terminal address. When this procedure has been carried out, a normal outgoing call (charged to the terminal address or otherwise as appropriate) can be made. When the call is terminated, the registration for outgoing UPT calls is resumed.

During this procedure, the UPT user must provide certain mandatory information and may provide additional optional information as follows:

- a) *Mandatory information* – UPT procedure type.
- b) No optional information is needed.

The address of the terminal in use is assumed for the suspension. Suspension of registrations from a remote terminal is therefore not allowed.

In case the registration for outgoing UPT calls to the used terminal address was part of a group registration, only the used terminal address is temporarily cancelled from the group.

The network will indicate to the user if the suspension is accepted or give an appropriate announcement if not, and the procedure is terminated. This procedure could be terminated due to lack of correct third-party authentication.

## **6 Operational provisions**

Operational service aspects involve the network capability of locating the UPT user for the purposes of addressing and routing of calls. Advanced operations and management systems are required to support UPT services. The architecture and capabilities of UPT supporting networks will impact operations systems functions.

### **6.1 UPT user aspects of operational provisions**

UPT user aspects of operational provisions include the following items:

- a) service provisioning;
- b) UPT service profile management.

## 6.2 UPT service provider aspects of operational provisions

UPT service provider aspects of operational provisions include the following items:

- a) performance monitoring of aspects affecting the UPT service;
- b) detection, localization and correction of faults affecting the UPT service;
- c) interworking management information between networks supporting the UPT service.

## Annex A

### UPT user identity authentication

(This annex forms an integral part of this Recommendation)

#### A.1 Example realizations of UPT user identity authentication

If UPT user identity authentication is provided by using a UPT device<sup>3)</sup>, the level of protection depends on how the device is realized. UPT devices may exist in different realizations depending on the networks, terminals and services used, which put different restrictions on the security mechanisms that can be provided in a simple and user-friendly way. For this reason, it may be necessary to have different authentication procedures for different realizations of the UPT devices. Possible realizations include:

- a) *No UPT Device* – In this case, the UPT user's UPT number may have to manually be input for identification, and it may be necessary to restrict the authentication procedure to the use of a PIN code only.
- b) *A Magnetic Strip-Card UPT Device* – This type of UPT device requires a terminal equipped with a magnetic strip card reader and a signalling interface to communicate with the network.
- c) *A Tone Type UPT Device One Way* (e.g. DTMF) – This device could either simply simulate the sequence of tones that would be generated by the UPT user who uses a PIN for authentication, or it could contain the intelligence to provide authentication procedures similar to that possible with an intelligent-card using one-way authentication (the UPT device transmits data only). See A.2 for more information.
- d) *A Modem Type UPT Device* – This would be similar in functionality to the Tone Type Device, but with the physical acoustic in-band signalling using a modem standard. Ideally, the authentication procedures should in this case be the same as with an intelligent-card using one-way or two-way authentication (i.e. the UPT device transmits and receives data).
- e) *An Intelligent-card Type UPT Device* – Either a one-way or a two-way authentication procedure could be used. UPT service provider authentication could be combined with subscriber identity authentication (mutual authentication).

The UPT device may require the UPT user to be authenticated to the device to prevent unauthorized users from fraudulently using the device. This could be done by using, for example, a PIN.

#### A.2 Example of UPT user identity authentication using a UPT device

This subclause presents the services requirements for an optional means of providing a relatively strong form of UPT user identity authentication in UPT Service Set 1.

The UPT device (e.g., tone type device, one way) provides a method for strong authentication. Other devices could be used. An example of the requirements for such a device is:

- a) The device would require the UPT user to be authenticated to the device to prevent unauthorized users from fraudulently using the device. This could be done using, for example, a PIN. The way that the UPT user authenticates himself to the device is an implementation issue.

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<sup>3)</sup> A device that contains UPT user identification information and that may be used to facilitate and automate the UPT user interaction with the UPT service.

- b) The device would use a standardized protocol to communicate authentication and command data with the local UPT service provider (e.g., through a voice channel). It must perform the necessary cryptographic calculations for secure authentication of the UPT user's identity and authentication of the requested procedures. The algorithms used should be standardized so that remote authentication is possible across networks.
- c) The device would provide a consistent (but implementation dependent) user-friendly command interface.
- d) The UPT user would interact with the device to enter the desired procedures together with any associated data. Once this interaction is complete, the UPT user dials an access code to connect with the UPT server. The UPT user would then use the device to send a burst of tones. The UPT server would then respond with either the appropriate confirmation messages or an indication of why the requested actions were denied.