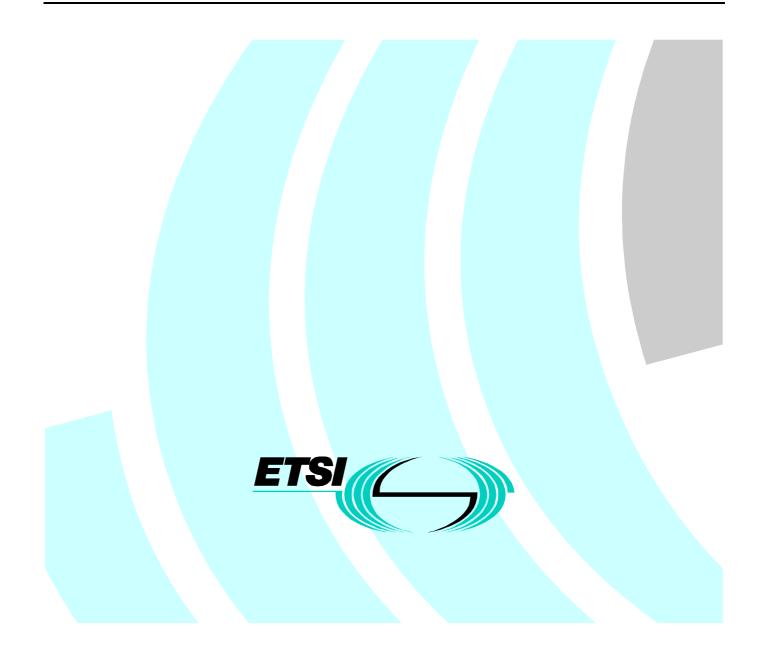# EN 301 175 V1.1.1 (1998-08)

European Standard (Telecommunications series)

Cordless Terminal Mobility (CTM);
Phase 1;
Service description

ETSI

Contents

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available **free of charge** from the ETSI Secretariat. Latest updates are available on the ETSI Web server (http://www.etsi.fr/ipr or http://www.etsi.org/ipr).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Network Aspects (NA).

In analogy with CCITT Recommendations I.130 [6], the first stage of the following three level structure is used to describe the telecommunications services as provided by European public telecommunications operators:

- Stage 1: is an overall service description, from the service subscriber's and user's standpoint;

- Stage 2: identifies the functional capabilities and information flows needed to support the service described in stage 1; and

- Stage 3: defines the signalling system protocols and switching functions needed to implement the service described in stage 1.

The present document details the stage 1 aspects (overall service description) for the Cordless Terminal Mobility (CTM) service, taking into account the various network architectures, e.g., Intelligent Network (IN).

The application of stage 2 and stage 3 may be different when the service is supported on an IN environment.

National transposition dates	
Date of adoption of this EN:	7 August 1998
Date of latest announcement of this EN (doa):	30 November 1998
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 May 1999
Date of withdrawal of any conflicting National Standard (dow):	31 May 1999

1   Scope

The present document defines the stage 1 service description for phase 1 of the Cordless Terminal Mobility (CTM) service. Stage 1 is an overall service description, primarily from the service subscriber's and user's point of view, but does not deal with the details of the human interface itself. The present document includes information applicable to network operators and terminal, switch and database manufacturers.

The present document specifies the requirements where the service is provided to the CTM user via a telecommunications network that is either the pan-European Integrated Services Digital Network (ISDN) or a Public Switched Telephone Network (PSTN) as provided by European public telecommunications operators.

The present document includes interworking requirements for cases where users in a call are located on different networks.

The provision of the CTM service on mobile networks is outside the scope of the present document.

The present document contains the core requirements for phase 1 of the Cordless Terminal Mobility (CTM) service. A service may be provided on the basis of these core requirements alone.

The present document also documents some optional service features which may be used to enhance the service.

Furthermore, additional functionalities not documented in the present document may be implemented. The requirements of which are considered outside of the scope of the present document and consequently outside the scope of the corresponding stage 2 and stage 3 standards. Such additional functionality may be on a network-wide basis, or particular to one CTM user or a group of CTM users. Such additional functionality does not compromise conformance to the core requirements of the service.

Charging principles are outside the scope of the present document, unless specific service requirements are stated. These requirements deal with the allocation of certain call charges to particular CTM users.

Interactions with services/supplementary services not listed in clauses 8 and 9 are outside the scope of the present document.

The Cordless Terminal Mobility (CTM) service allows users of cordless terminals to be mobile within and between networks. Where radio coverage is provided and the cordless terminal has appropriate access rights the CTM user is able to make calls from, and to receive calls at, any location within the fixed public and/or private networks, and may move without interruption of a call in progress.

Phase 1 of the Cordless Terminal Mobility (CTM) service is applicable to the telephony 3,1 kHz teleservice (see ETS 300 111 [2]). Phase 1 of the CTM service is also applicable to the speech bearer service (see ETS 300 109 [3]) and the 3,1 kHz audio bearer service (see ETS 300 110 [4]).

If the present document is applicable to the stage 2 and stage 3 standards for the phase 1 of the CTM service, where the text indicates the status of a requirement (i.e. as strict command or prohibition, as authorization leaving freedom, as a capability or a possibility), this shall be reflected in the relevant stage 2 and stage 3 standards. Otherwise, the status of a requirement shall be reflected in the relevant standards for the underlying protocols. Furthermore, conformance to the present document is either met by:

-   conforming to the stage 3 standards; or

-   implicitly covered by conforming to the standards for the underlying protocols,

with the field of application appropriate to the equipment being implemented. Therefore no method of testing is provided for the present document.

2 Normative references

References may be made to:

    a) specific versions of publications (identified by date of publication, edition number, version number, etc.), in which case, subsequent revisions to the referenced document do not apply; or

    b) all versions up to and including the identified version (identified by "up to and including" before the version identity); or

    c) all versions subsequent to and including the identified version (identified by "onwards" following the version identity); or

    d) publications without mention of a specific version, in which case the latest version applies.

A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

    [1] ETS 300 345 (1994): "Integrated Services Digital Network (ISDN); Interworking between public ISDNs and private ISDNs for the provision of telecommunication services; General aspects".

    [2] ETS 300 111 (1992): "Integrated Services Digital Network (ISDN); Telephony 3,1 kHz teleservice; service description".

    [3] ETS 300 109 (1992): "Integrated Services Digital Network (ISDN); Circuit-mode 64 kbit/s 8 kHz structured bearer service category usable for speech information transfer; Service description".

    [4] ETS 300 110 (1992): "Integrated Services Digital Network (ISDN); Circuit-mode 64 kbit/s 8 kHz structured bearer service category usable for 3,1 kHz audio information transfer; Service description".

    [5] CCITT Recommendation E.164 (1991): "Numbering plan for the ISDN era".

    [6] CCITT Recommendation I.130 (1988): "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".

    [7] CCITT Recommendation I.112 (1988): "Vocabulary of terms for ISDNs".

    [8] CCITT Recommendation I.210 (1988): "Principles of telecommunication services supported by an ISDN and the means to describe them".

    [9] CCITT Recommendation Q.9 (1988): "Vocabulary of switching and signalling terms".

3 Definitions

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

authentication: A security mechanism allowing the verification of the provided identity.

access rights: An indication that the cordless terminal has appropriate access allowance to the CTM service.

    NOTE 1: This definition does not refer to any specific access technology.

access rights identity: An identity which is globally unique to a service provider and which shows the access rights related to this service provider.

Basic Call (procedures): The procedures by which a call (as an instance of a basic telecommunication service) is established and terminated.

    NOTE 2: Emergency call is not a basic call.

cordless terminal: A physical entity that provides access to the telecommunication services of a network via a radio interface.

core service feature: Particular service feature fundamental to the telecommunication service, i.e., in the absence of this service feature, the telecommunication service does not make sense as a commercial offering to the service subscriber.

coverage area: The area within the radio coverage area in which the user has subscribed to use the CTM service.

CTM identity: The identity by which a user is known to the CTM service providers and networks supporting CTM, and it is used for flexibility and security purposes. The CTM identity identifies a CTM user unambiguously. The CTM identity does not need to be known by users.

CTM number: A number that uniquely and unambiguously identifies each user. It is used by a calling party to reach the CTM user. The number is independent of the calling terminal, network or service used and it is an E.164 number.

E.164 number: A number conforming to the numbering plan and structure specified in CCITT Recommendation E.164 [5].

forwarded-to number: A number to which the call is redirected as a result of call forwarding.

handover: The process by which a call in progress is maintained when the CTM user moves with the cordless terminal with a call in progress within a network where continuous radio coverage is provided.

location area: The radio coverage area in which a cordless terminal may receive calls as a result of a single location registration.

location registration: The process whereby the position of a CTM terminal is determined to the level of one location area.

network operator: An entity that provides the network operating elements and resources for the execution of the CTM service.

not reachable: The status in the network when an incoming call is offered to a cordless terminal but the cordless terminal is out of radio coverage, switched off or there is radio congestion.

optional service feature: A service feature added to core feature to optionally enhance a service offering.

radio coverage: The area in which cordless terminals may be used to establish and maintain telecommunication services via the radio base stations supported by the network supporting the CTM service.

NOTE 3: The radio coverage supported by an individual network supporting the CTM service may be continuous or discontinuous, i.e. it may correspond to the complete geographical territory served by the network or it may not.

In the case of discontinuous radio coverage, the areas of radio coverage may consist of individual radio cells, serving for example isolated houses or very small businesses, or cordless islands consisting of a collection of radio cells providing continuous coverage of larger areas.

The radio coverage supported by a network supporting the CTM service may overlap with the radio coverage supported by one or more other networks supporting the CTM service or it may be complementary.

roaming: The CTM user moves with the cordless terminal without a call in progress from one location area to another location area within the same and/or between different networks supporting the CTM service.

service feature: A specific aspect of a telecommunication service that can also be used in conjunction with other telecommunication services or service features as part of a commercial offering. It is either a core part of a telecommunication service or an optional part offered as an enhancement to a telecommunication service.

service profile: A record containing all the service information related to a CTM user.

service provider: An actor who provides CTM services to its service subscribers on a contractual basis and who is responsible for the CTM services offered. The same organization may act as a network operator and a service provider.

service subscriber: An entity that contracts for services offered by service providers.

service: That which is offered by an administration or a public or private service provider to its service subscriber in order to satisfy a telecommunication requirement.

terminal mobility: The ability of a terminal to access telecommunication services, while in motion, and the capability of the network to locate and identify that terminal as it moves.

user: A person or machine delegated by a service subscriber to use the services and/or facilities of a telecommunication network .

4　Abbreviations

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

CFNRc	Call Forwarding on Not Reachable
CLIR	Calling Line Identification Restriction
COLR	Connected Line Identification Restriction
CTM	Cordless Terminal Mobility
DTMF	Dual Tone Multi Frequency
IN	Intelligent Network
ISDN	Integrated Services Digital Network
PISN	Private Integrated Services Network
PSPDN	Packet-Switched Public Data Network
PSTN	Public Switched Telephone Network
UPT	Universal Personal Telecommunication

5　Description

The CTM service allows users of cordless terminals to be mobile within and between networks. Where radio coverage is provided and the cordless terminal has appropriate access rights the CTM user shall be able to make calls from, and to receive calls at, any location within the fixed public and/or private networks, and may move without interruption of a call in progress.

The CTM service can be composed by "core service features" and "optional service features". The core service features provide a basic service, available to all CTM users.

The optional service features contain functionality that is additional to the core service features, that customize the service according to the needs of a specific service subscriber. These additional parts may be offered either to all the service provider's service subscribers, or to a group of service subscribers or even to a single service subscriber.

In addition to core service features, a network can implement optional service features. The availability to roaming CTM users of the optional features depends on the implementation of the optional features in other networks.

5.1　Core service features

The core service features are listed hereafter.

5.1.1　Numbering

The CTM number can be a non-geographical number or a geographical number according to the operator's choice.

It may therefore be possible for a user subscribing to the CTM service to keep the user's existing E.164 number as a network option.

> NOTE: When a user subscribes to the CTM service using the user's existing E.164 number as the CTM number, calls to the served user's E.164 number may be routed either to the served user's cordless terminal or to the served user's fixed terminal according to the operator's choice.

5.1.2   Outgoing call

This service feature enables a CTM user to originate calls from the cordless terminal irrespective of its location in the coverage area.

The network may verify that the CTM user is permitted to place the call as requested.

5.1.3   Emergency call

This service feature enables a user to make an emergency call, i.e. a fast and easy means of giving information (at least the user's registered location) about an emergency situation to the appropriate emergency organization (e.g. fire service, police and ambulance).

> NOTE: In some networks users may need to first register their location.

5.1.4   Incoming call

This service feature enables a CTM user to have incoming calls delivered to the cordless terminal irrespective of its location in the coverage area. The CTM user holds a CTM number that has to be used to reach the cordless terminal associated to this CTM number, wherever it is located, within the coverage area.

If the network is unable to complete an incoming call, the network shall send an appropriate notification to the calling user.

5.1.5   Roaming

This service feature enables a CTM user without a call in progress to move within the coverage area. Therefore, the network shall enable the roaming CTM user to register its current location. The deregistration of the CTM user's previous location shall also be performed. The extent to which roaming is permitted, may depend on the CTM user's subscription.

As an option, roaming can be provided to and from the CTM user's own residential area.

As a network operator/service provider option, a CTM user can roam to and from another CTM user' residential area with that user agreement.

> NOTE 1: In the user own residential area it is a network operator/service provider option to provide alternative or additional services. The provision of these services is out of the scope of the present document.

> NOTE 2: Roaming within and between networks supporting CTM requires that all networks maintain access rights information relating to each service provider with whom a roaming agreement exists.

5.1.6   Handover

This service feature enables a CTM user to move with the cordless terminal with a call in progress within a network where continuous radio coverage is provided and the cordless terminal has appropriate access rights.

Handover from one network to another is outside the scope of phase 1 of the CTM service. In addition, within a network there may be limitations on handover. Consequently, calls may be terminated in these cases.

5.1.7   Security

This service feature enables the CTM user (and the network) to be protected from different types of misuse due to the CTM service. Different type of security mechanisms may be used to protect from:

- fraudulent use;

- fraudulent access;

- eavesdropping;

- malicious behaviour.

Access network security mechanisms shall be provided by using terminal authentication, network authentication and encryption subject to the limitations of the appropriate cordless access standards.

Different service providers may offer different levels of security mechanisms to its subscribers.

5.1.7.1 Terminal authentication

Terminal authentication is a security mechanism by which the network verifies that the identity provided by the terminal is the one claimed.

The purpose of this authentication security feature is to protect the network against unauthorized use. It enables also the protection of the service subscriber by denying the possibility for intruders to impersonate authorized CTM users.

The authentication of the terminal may be invoked by the network in various cases e.g. when the service subscriber requests for:

- access a service (including some or all of: originating or terminating CTM call, activation or deactivation of a feature/supplementary service); or

- a change of service subscriber related information (including some or all of: location handling, registration or erasure of a feature/supplementary service).

5.1.7.2 Network authentication

Network authentication is a security mechanism by which a cordless terminal verifies that the identity provided by the network is the one claimed.

The purpose of this authentication security feature is to protect the cordless terminal from unauthorized access.

5.1.7.3 Encryption

Encryption is a security mechanism by which the user and signalling information is encrypted over the air interface.

The purpose of the encryption feature is to protect the user and signalling information from eavesdropping.

5.1.8 Service profile

This service feature enables the CTM user to be provided with the CTM service according to subscription parameters as determined by the service provider. For that purpose, a service profile (e.g. containing the information needed for a correct call handling) shall be maintained for the CTM user.

5.2 Optional service features

Some possible optional service features are listed hereafter, but the service provider may offer other additional service features.

5.2.1 Service profile modification

This service feature enables the CTM user to modify some data in the CTM user's service profile. The CTM user may not have access to all the data in the user's service profile.

   NOTE: The service profile modification may take place from another terminal than the served user's cordless
            terminal, e.g. by using Dual Tone Multi Frequency (DTMF) signalling.

5.2.2 Service profile interrogation

This service feature enables the CTM user to perform interrogation of some data in the CTM user's service profile. The CTM user may not have access to all the data in the user's service profile.

NOTE: The service profile interrogation may take place from another terminal than the served user's cordless terminal, e.g. using DTMF signalling.

6 Procedures

From the CTM user's perspective, the procedures of ETS 300 111 [2], ETS 300 109 [3] and ETS 300 110 [4], as appropriate for the required basic service, shall apply for the calls using the CTM service. This clause contains the additional procedures for the support of cordless terminals. The procedures specified in this clause are applicable for the served user's cordless terminal.

6.1 Provision and withdrawal

The CTM service shall be provided after prior arrangement with the service provider. The service subscriber and the service provider have a contractual relationship and agree upon the service details, e.g. the coverage area could be a part of the contract. The service provider and the involved network operators make arrangements for service provision by the network(s).

The CTM service to the CTM user shall be provided by prior arrangement between the service provider and the network operator(s). The network shall be able to maintain a service profile for the CTM service subscriber. A service profile shall be created for the CTM user.

The CTM service shall be withdrawn from a specific user upon request of the service subscriber or for service provider reasons.

6.2 Normal procedures

6.2.1 Registration, deregistration and erasure

6.2.1.1 Core requirements

Before the CTM user receives access rights to the service, its cordless terminal has to be made known to the network and certain identities and other specific information shall be exchanged between network and terminal by means of on-air procedures. This process of obtaining access rights is called service registration. This procedure is used by the cordless terminal to gain access to the network to enable calls to be made and received.

Access rights for a cordless terminal shall be terminated by following a service deregistration procedure.

Service registration and deregistration are administrative procedures controlled by the service provider.

The network shall support procedures for service registration and de-registration. If service registration or de-registration is performed then this shall be valid throughout the area of service provision, i.e. a roaming CTM user shall not be required to perform new service registrations while roaming between networks.

6.2.1.2 Optional requirements

Access rights can be terminated by means of on-air procedures.

The CTM user can register and erase data in the user's service profile by means of procedures. As a network option it could be possible to give the CTM user knowledge of some or all the data in the user's service profile. It is a service provider option to define the limit of restriction for the registration and erasure procedures.

The network shall respond with the requested information to the CTM user if knowledge is allowed.

6.2.2   Activation and deactivation

6.2.2.1   Core requirements

The CTM service to a user shall be activated when that user makes its location known to the network (location registration). This may occur for new subscriptions. Location registration shall cause the network to register the user at the current location area.

6.2.2.2   Optional requirements

Not applicable.

6.2.3   Invocation and operation

6.2.3.1   Core requirements

Roaming

For each CTM user, information shall be maintained relating to the location of the CTM user within the network.

Location registration shall be invoked to register a CTM user's current location area when the location area has changed.

Location registration shall cause the network to register the CTM user at the current location area. The location information at the previously visited location shall be deleted. When the procedures are completed, the location registration shall be confirmed to the CTM user.

    NOTE: As a result of a location registration the network may assign a temporary identity to the CTM user.

Authentication

At any time a CTM user is registered in the network, authentication may be invoked. Authentication may be invoked by both the CTM user and the network. Upon invocation by the network, the network sends specific information (challenge) to the CTM user and awaits a response. The response from the CTM user to the network may either indicate success or failure or contain sufficient information to the network to determine the result. If the result is not the expected response, the network may take any action as appropriate. Upon invocation of authentication by the CTM user, the CTM user sends specific information (challenge) to the network and awaits a response. The response from the network to the CTM user may either indicate a success or a failure or contain sufficient information to the CTM user to determine the result. If the result is not the expected response, the CTM user may take any action as appropriate. The scope of network authentication is limited to security aspects related to service registration/de-registration.

Encryption

In order to protect the CTM user and signalling information from eavesdropping encryption on the air interface shall be invoked.

Outgoing call

If the CTM user originates a call, the network shall verify that the CTM user is registered in the network, and if so, set the originating number to the complete CTM number, if applicable. The network shall then make the CTM user's service profile available in order to check the relevant CTM subscribed feature, with further call establishment following normal basic call procedures.

When a user originates a call the network shall be capable of discriminating an emergency service access request from non-emergency service requests in order to ensure that it is possible to bypass the normal call validation and establishment mechanisms. The network accepting the call shall not apply authentication procedures. Where applicable, emergency calls shall take priority over other calls waiting.

Incoming call

When analysis of a destination number for an incoming call indicates that the called user is the CTM user , the network shall route the call to the CTM user using the CTM user's currently registered location.

6.2.3.2   Optional requirements

Not applicable.

6.2.4   Interrogation

6.2.4.1   Core requirements

Not applicable.

6.2.4.2   Optional requirements

The CTM user can interrogate data in the user's service profile by means of procedures. The CTM user should have access to the data in the user's service profile. However, as a service provider option some data can be restricted for the interrogation procedure.

The network shall respond with the requested information to the CTM user if access is allowed.

6.3   Exceptional procedures

6.3.1   Registration and erasure

6.3.1.1   Core requirements

Subscription registration shall be rejected under at least the following circumstances:

-    authentication fails;

-    terminal identity unknown.

6.3.1.2   Optional requirements

Termination of access rights shall be rejected if the network authentication fails.

If the CTM user requests to register or erase inaccessible service profile data then the network shall reject such a request.

6.3.2   Activation and deactivation

6.3.2.1   Core requirements

Location registration shall be rejected under at least the following circumstances:

-    user identity not known;

-    user not permitted to register in the current location area;

-    location registration temporarily not possible.

6.3.2.2   Optional requirements

Not applicable.

6.3.3   Invocation and operation

6.3.3.1   Core requirements

<u>Roaming</u>

Location registration shall be rejected under at least the following circumstances:

- user identity not known;

- user not permitted to register in the current location area;

- location registration temporarily not possible.

<u>Authentication</u>

If authentication fails for one of the following reasons, the network may withdraw or limit the service to the CTM user. Possible reasons for failure are:

- incorrect authentication parameters;

- cordless terminal not accessible.

<u>Encryption</u>

If the encryption fails then the connection may proceed without protection from eavesdropping.

<u>Outgoing call</u>

The network may reject outgoing call requests from a user with an appropriate failure indication for any of the following reasons:

- no originating number provided;

- the indicated user is not registered at the network.

<u>Incoming call</u>

If the network is unable to complete an incoming call to a user, an indication that the call was unsuccessful shall be sent to the calling user. Normal basic call failure procedures shall be used.

6.3.3.2   Optional requirements

Not applicable.

6.3.4   Interrogation

6.3.4.1   Core requirements

Not applicable.

6.3.4.2   Optional requirements

If the CTM user requests to interrogate inaccessible service profile data then the network shall reject such a request.

7   Interworking requirements

7.1   Interworking between public networks providing the CTM service

CTM shall be supported in a co-operative manner across the inter-network interface between different public networks.

> NOTE: A public network can be comprised of ISDN and PSTN.

Interworking in terms of roaming between different public networks is included in CTM phase 1 for basic call only.

In cases where a CTM user is at a location which is within the coverage area of more than one network, e.g. two public networks, the CTM user can choose the network with which the CTM user's location is registered. This can be performed automatically by the terminal or by user procedures.

7.1.1   Public CTM user roams into a visited public network

The procedures at the boundary between the different public networks shall enable a user, with a subscription in the home public network, to roam into, and out of, a visited public network whilst retaining the service related to the CTM user's home public network subscription. For CTM phase 1 this will be limited to basic call functionality.

The visited public network shall co-operate with the home public network to offer the CTM user the same procedures (for location handling, authentication and call handling) as specified in clause 6, i.e. as if the CTM user was attached to the home public network.

> NOTE: This assumes that the visited public network has implemented similar procedures, as specified for the home public networks. In cases where some procedures have not been implemented in the visited public network, then there may be limitations on the operation of some aspects of the CTM service.

7.2   Interworking with private networks

CTM shall be supported in a co-operative manner across the inter-network interface between public and private networks.

If CTM is provided by an ISDN, then interworking with private ISDNs shall include the requirements given in ETS 300 345 [1].

Interworking in terms of roaming between public and private ISDNs is included in CTM phase 1 for basic call only.

In cases where a CTM user is at a location which is within the coverage area of more than one network (e.g. a public and a private network), the CTM user can choose the network with which the CTM user's location is registered. This can be performed automatically by the terminal or by user procedures.

7.2.1   Public CTM user roams into a Private Integrated Service Network (PISN) area

The procedures at the boundary between public and private network shall enable a CTM user, with a subscription in the public network, to roam into, and out of, a PISN area whilst retaining the service related to its public network subscription. For CTM phase 1 this will be limited to basic call functionality.

The public network shall co-operate with the PISN to offer the CTM user the same procedures (for location handling, authentication and call handling) as specified in clause 6, i.e. as if the CTM user was attached to the public ISDN.

> NOTE: This assumes that the PISN has implemented similar procedures to those specified for public networks. In cases where some procedures have not been implemented in the private network, then there may be limitations on the operation of some aspects of the CTM service.

7.2.2 Private CTM user roams into a public CTM network area

The procedures at the boundary between public and private network shall enable a CTM user, with a subscription in the private network, to roam into, and out of, a public CTM network area whilst retaining the service related to its private network subscription. For CTM phase 1 this will be limited to basic call functionality.

The public network shall co-operate with the PISN in offering the CTM user the same procedures (for location handling, authentication and call handling) as specified for private networks, i.e. as if the CTM user was attached to the PISN.

NOTE: This assumes that the public network has implemented similar procedures to those specified for private networks. In cases where some procedures have not been implemented in the public network, then there may be limitations on the operation of some aspects of the CTM service.

7.3 Interworking with networks not providing the CTM service

Interworking in terms of roaming between a public network supporting the CTM service and a network not supporting the CTM service (e.g. a mobile network) is outside the scope of the present document. Calls between those networks shall be supported.

NOTE: Packet-Switched Public Data Network (PSPDN) interworking is for further study.

7.4 Co-operation between network operators and service providers

Interworking between different service providers in phase 1 is to be handled as covered in subclauses 7.1, 7.2 and 7.3. A prerequisite for support of public CTM users in a private network is that a roaming agreement has been established between the involved public and private network operators and/or service providers. The roaming agreement can either be in only one direction, e.g. from public to private networks or from private to public networks, or in both directions.

8 Interaction with ISDN supplementary services

Interactions between the CTM service and ISDN supplementary services have not been considered, unless specific indication is given.

The specified interactions are according to the following principles:

- the ISDN supplementary services are subscribed to on an ISDN access;

- the CTM user does not have any supplementary services, except from the Call Forwarding on Not Reachable (CFNRc) and "permanent mode" of the Calling Line Identification Restriction (CLIR) supplementary service and the Connected Line Identification Restriction (COLR) supplementary service;

- "CTM calling user" means that the call in question originates from the CTM user and terminates at the ISDN user;

- "CTM called user" means that the call in question originates from an ISDN user and terminates at the CTM user.

8.1 Number identification services

8.1.1 Calling line identification presentation

CTM calling user:

The called user shall not receive information pertaining to the CTM users registered location, but the CTM number of the calling user.

8.1.2 Calling line identification restriction

CTM calling user:

When the "permanent mode" of the calling line identification restriction supplementary service has been invoked, the calling user's CTM number shall not be presented to the called user unless the called user has an override capability.

8.1.3 Connected line identification presentation

CTM called user:

The calling user shall not receive information pertaining to the CTM user's registered location but the CTM number of the called user.

8.1.4 Connected line identification restriction

CTM called user:

When the "permanent mode" of the connected line identification restriction supplementary service has been invoked, the called user's CTM number shall not be presented to the calling user unless the calling user has an override capability.

8.2 Closed user group

No impact, i.e. neither service shall affect the operation of the other service.

> NOTE: Since the closed user group supplementary service is not available for users in phase 1 of the CTM service, restrictions applied by the closed user group supplementary service may block CTM calls.

8.3 Call completion services

8.3.1 Completion of calls to busy subscriber

CTM called user:

The completion of calls to busy subscriber request shall be rejected.

8.3.2 Completion of calls on no reply

CTM called user:

The completion of calls on no reply request shall be rejected.

8.4 Malicious call identification

CTM calling user:

Both the CTM number and the number of the CTM user's currently registered location shall be registered.

9 Interaction with other services

9.1 Universal Personal Telecommunication (UPT)

No impact, i.e. neither service shall affect the operation of the other service.

> NOTE: The CTM service and the UPT service are independent of each other.

10   Applicability of supplementary services to the CTM service

The following supplementary services are applicable to phase 1 of the CTM service:

- CFNRc, see annex B;

- "permanent mode" of CLIR; and

- "permanent mode" of COLR.

No other supplementary services are standardized in phase 1 of the CTM service.

Annex A (normative):
CFNRc supplementary service

A.1   Scope

This annex defines the stage one of the CFNRc supplementary service for the Pan-European Integrated Services Digital Network (ISDN) as provided by European public telecommunications operators. Stage one is an overall service description from the user's point of view, but does not deal with the details of the human interface itself (see CCITT Recommendation I.130 [6]).

This annex defines the interworking requirements of private ISDNs with the public ISDN.

This annex does not specify the additional requirements where the service is provided to the user via a telecommunications network that is not an ISDN but does include interworking requirements of other networks with the public ISDN.

Charging principles are outside the scope of this annex.

Interaction with supplementary services not listed in clause A.8 are outside the scope of this annex.

The CFNRc supplementary service enables a served user to have the network redirect to another user calls which are addressed to the served user's ISDN number. The CFNRc supplementary service operates on all calls. The served user's ability to originate calls is in principle unaffected by the CFNRc supplementary service.

   NOTE: Practically the served user's ability to originate calls is affected if there is radio congestion or if the served user's cordless terminal for example is being out of radio coverage.

After the CFNRc supplementary service has been activated, calls are forwarded only if the served user's cordless terminal is not reachable.

This annex is applicable to the stage two and stage three standards for the ISDN CFNRc supplementary service. The terms "stage two" and "stage three" are also defined in CCITT Recommendation I.130 [6]. Where the text indicates the status of a requirement (i.e. as strict command or prohibition, as authorization leaving freedom, as a capability or possibility), this shall be reflected in the text of the relevant stage two and stage three standards.

Furthermore, conformance to this annex is met by conforming to the stage three standards with the field of application appropriate to the equipment being implemented. Therefore, no method of testing is provided for this annex.

A.2   Normative references

The normative references are cited in clause 2 of the present document.

A.3   Definitions

For the purposes of this annex, the following definitions apply:

Integrated Services Digital Network (ISDN): See CCITT Recommendation I.112 [7], § 2.3, definition 308.

(basic) service; telecommunication service: See CCITT Recommendation I.112 [7], § 2.2, definition 201.

user A: The calling user in a call which is subject to diversion.

user B: The served user when a call (from user A) is subject to the CFNRc supplementary service.

   NOTE: In the context of multiple diversions, a suffix is used, e.g. 1, 2, ... n, n+1, ... m, to denote the successive diverting users. For example, user B3 is also the diverted-to user with respect to the diversion applied at user B2.

user C: The forwarded-to user in a call which is subject to the CFNRc supplementary service. In the case of a call which is subject to multiple diversions, user C is the forwarded-to user with respect to the final call forwarding.

diverted-to user: A user to whom a call is redirected as a result of diversion.

supplementary service: See CCITT Recommendation I.210 [8], § 2.4.

ISDN number: A number conforming to the numbering plan and structure specified in CCITT Recommendation E.164 [5].

address: See CCITT Recommendation E.164 [5], § 12.

served user: the user to whom the CFNRc supplementary service is provided.

forwarded-to user: A user to whom the call is redirected as a result of forwarding.

(call) forwarding: a general term applied to any functionality whereby a call is redirected automatically by the service provider to another user. The forms of forwarding are: unconditional, whereby all calls are redirected; busy, whereby calls encountering busy are redirected; no reply, whereby calls which are not answered within a time period are redirected; and, not reachable, whereby calls which are encountering not reachable are redirected.

diversion: A general term which includes all forms of forwarding, and includes deflection whereby calls are redirected by the user instead of being answered.

basic call procedures: The procedures by which a call (as an instance of a basic telecommunication service) is established and terminated.

diverting user: A user for whom the call is subjected to diversion.

not reachable: The status in the network when an incoming call is offered to a cordless terminal but the cordless terminal is out of radio coverage, switched off or there is radio congestion.

A.4   Symbols and abbreviations

CFNRc   Call Forwarding on Not Reachable
ISDN   Integrated Services Digital Network
PSTN   Public Switched Telephone Network

A.5   Description

The CFNRc supplementary service enables a served user to have the network redirect to another user calls which are addressed to the served user's ISDN number. The CFNRc supplementary service operates on all calls. The served user's ability to originate calls is in principle unaffected by the CFNRc supplementary service.

   NOTE: Practically the served user's ability to originate calls is affected if there is radio congestion or if the served user's cordless terminal for example is being out of radio coverage.

After the CFNRc supplementary service has been activated, calls are forwarded only if the served user's cordless terminal is not reachable.

The maximum number of diversions permitted for each call is a service provider option with an upper limit of five diversions. When counting the number of diversions, all types of diversion are included.

A.6   Procedures

A.6.1   Provision and withdrawal

The CFNRc supplementary service shall be provided after prior arrangement with the service provider.

As a service provider option, the service can be offered with one subscription option. Only one value can be selected. The subscription option is specified in table A.1.

Table A.1

Subscription option	Value
Calling user receives notification that the call has been forwarded	- no - yes

The CFNRc supplementary service shall be withdrawn by the service provider upon request of the subscriber or for service provider reasons.

A.6.2   Normal procedures

A.6.2.1   Activation, deactivation, registration and erasure

A.6.2.1.1   Activation

The served user shall be able to activate the CFNRc supplementary service.

When the served user's request to activate the CFNRc supplementary service is accepted, the service provider shall inform the served user.

A.6.2.1.2   Deactivation

The CFNRc supplementary service can be deactivated in either of two ways:

-    the served user can request the deactivation of the CFNRc supplementary service. The service provider shall inform the served user that the previous activation of the CFNRc supplementary service has been deactivated;

-    the CFNRc supplementary service is deactivated as a result of erasure.

A.6.2.1.3   Registration

The served user shall supply the ISDN number of the forwarded-to user when requesting the registration of the CFNRc supplementary service.

Verification of the forwarded-to number can be carried out before accepting the request to activate the CFNRc supplementary service.

When the served user's request to register the CFNRc supplementary service is accepted, the service provider shall inform the served user.

A.6.2.1.4   Erasure

A previous registration can be erased in either of three ways:

1) the served user can specifically request erasure of the CFNRc supplementary service. When the served user's request for erasure is accepted, the service provider shall inform the served user.

2) the served user can request registration of the CFNRc supplementary service to another forwarded-to user's ISDN number, thus causing the previous registration of the CFNRc to be overridden.

3) all information is erased as a result of withdrawal of the supplementary service.

A.6.2.2   Invocation and operation

The maximum number of diversions for each call shall be limited. The maximum number of diversions is a service provider option with an upper limit of five diversions for each call. When counting the number of diversions, all types of diversions shall be included.

A.6.2.2.1   Served user's view

When the CFNRc supplementary service has been activated, then an incoming call to the served user who is not reachable shall be forwarded.

A.6.2.2.2   Forwarded-to user's view

Not applicable.

A.6.2.2.3   Calling user's view

Depending on the value of the served user's subscription option "calling user receives notification that the call has been forwarded", user A can be given an indication that the call is being forwarded. In that case, this information shall be given when the network originates the call to the forwarded-to user.

When calls are forwarded once, i.e. due to a single invocation of the CFNRc supplementary service, the following information shall be given to user A based on the value of the served user's subscription option "calling user receives notification that the call has been forwarded":

-   if the value of the subscription option is "no", then no information shall be sent to user A;

-   if the value of the subscription option is "yes, then an indication that the call is being forwarded shall be sent to user A.

NOTE: In the remaining part of this subclause, the terms "forwarded" and "forwarded-to" should be taken to include all types of diversion.

When calls are forwarded due to multiple diversions, the following information shall be given to user A based on the value of the subscription option "calling user receives notification that the call has been forwarded" for each of the served users:

-   if the value of user B1's subscription option is "no", then no information shall be sent to user A;

-   if the value of user B1's subscription option is "yes, then an indication that the call is being forwarded shall be sent to user A.

A.6.2.3   Interrogation

The served user can interrogate the network in order to determine the status of the CFNRc supplementary service.

The following information shall be provided in response to a request:

-   the CFNRc supplementary service is not currently activated; or

-   the CFNRc supplementary service has been activated.

If the CFNRc supplementary service has been activated, the address of the forwarded-to user shall be provided as additional information.

A.6.3   Exceptional procedures

A.6.3.1   Activation, deactivation, registration and erasure

A.6.3.1.1   Activation

If the user attempts to activate the CFNRc supplementary service and the service provider cannot comply with the request, the service provider shall reject the request and give the reason for rejection.

Possible reasons for rejection are:

- the CFNRc supplementary service is not subscribed to;

- there is no forwarded-to number registered for the CFNRc supplementary service.

A.6.3.1.2   Deactivation

If the user attempts to deactivate the CFNRc supplementary service and the service provider cannot comply with the request, the service provider shall reject the request and give a reason for rejection.

Possible reasons for rejection are:

- the CFNRc supplementary service is not subscribed to;

- the CFNRc supplementary service has not been activated.

A.6.3.1.3   Registration

If the user attempts to perform registration of information for the CFNRc supplementary service and the service provider cannot comply with the request, the service provider shall reject the request and give the reason for rejection.

Possible reasons for rejection are:

- the CFNRc supplementary service is not subscribed to;

- insufficient information provided by the user;

- forwarded-to number is a special service number (see note);

- the ISDN number of the forwarded-to user is the served user's ISDN number;

- forwarded-to number is an invalid ISDN number;

NOTE: Service providers may prevent a served user from activating the CFNRc supplementary service when the ISDN number specified for the forwarded-to user has special significance, e.g. emergency services, operator services. The identification of such numbers is outside the scope of the present document.

A.6.3.1.4   Erasure

If the user attempts to perform erasure of information for the CFNRc supplementary service and the service provider cannot comply with the request, the service provider shall reject the request and give a reason for rejection.

Possible reasons for rejection are:

- the CFNRc supplementary service is not subscribed to;

- no registration has been performed for the CFNRc supplementary service.

A.6.3.2   Invocation and operation

Calls to an ISDN number which use a basic service which is not subscribed to by the served user shall not be forwarded by the CFNRc supplementary service.

If the limit on the number of diversions has been reached, then a subsequent attempt to invoke the CFNRc supplementary service shall not be made.

If the call to the forwarded-to user cannot be completed, then the forwarded part of the call shall be terminated (if this has not already occurred).

A.6.3.3 Interrogation

If the user attempts to interrogate the CFNRc supplementary service and the service provider cannot comply with the request, the service provider shall reject the request and give a reason for rejection.

A possible reason for rejection is that the CFNRc is not subscribed to.

A.7 Intercommunication considerations

In the case of diversion within an ISDN, or across more than one ISDN, e.g. ISDNs in different countries or continents, or when interworking between an ISDN and a PSTN occurs, a decrease in quality of service parameters may arise. A network may provide some precautions to prevent this situation occurring, e.g. restrict the propagation delay, or limit the number of satellite hops.

In interworking situations when information is passed to other networks which do not support the requirements of the present document, information could be discarded.

A.7.1 Interworking with non-ISDNs

User A and/or the forwarded-to user can belong to a non-ISDN.

NOTE 1: The number of times a call will be diverted once it has exited the ISDN cannot be limited by the ISDN.

NOTE 2: Once a call has been forwarded to a non-ISDN, then any further diversion and/or indications to the calling user are outside the scope of the present document.

NOTE 3: Indications to the calling user attached to a non-ISDN are outside the scope of the present document.

A.7.2 Interworking with private ISDN

When a remote user (i.e. a calling user or a forwarded-to user) is on a network different from that of the served user (e.g. one user is on a private ISDN and the other user on a public ISDN), indications to the remote user shall be sent to the remote user's network for forwarding to the remote user.

If the private ISDN detects forwarding back to a destination in the public ISDN, the private ISDN can request that forwarding is performed by the public ISDN assuming that the public ISDN offers this functionality. When the private ISDN requests the public ISDN to perform the forwarding, the private ISDN shall be informed of any invocation failure.

NOTE: In the case of invocation failure, subsequent actions performed by the private ISDN are outside the scope of the present document.

In all cases, the limit on the total number of diversions (see subclause A.6.2.3) shall continue to apply when calls are forwarded from a private ISDN to a public ISDN, or forwarded from a public ISDN to a private ISDN.

A.8 Interaction with other (supplementary) services

In case of that the CFNRc supplementary service is invoked it shall take precedence over the notification which otherwise shall be given to the calling user.

Interactions between the CFNRc supplementary services and other (supplementary) services the CTM user can subscribe to are specified hereafter. Interactions have not been considered, unless specific indication is given.

A.8.1   Number identification services

A.8.1.1   Calling line identification restriction

No impact, i.e. neither supplementary service shall affect the operation of the other supplementary service.

A.8.1.2   Connected line identification restriction

No impact, i.e. neither supplementary service shall affect the operation of the other supplementary service.

A.8.2   Diversion services

A.8.2.1   Call forwarding on not reachable

Not applicable.

A.8.3   Remote control service

No impact, i.e. neither (supplementary) service shall affect the operation of the other (supplementary) service.

History

Document history				
V1.1.1	April 1998	One-step Approval Procedure	OAP 9831:	1998-04-03 to 1998-07-31
V1.1.1	August 1998	Publication		