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European Standard (Telecommunications series)

**Integrated Services Digital Network (ISDN);
Digital Subscriber Signalling System No. one (DSS1) and
Signalling System No.7 (SS7) protocols;
Call Forwarding on Not Reachable (CFNRc)
supplementary service for
Cordless Terminal Mobility (CTM) phase 1;
Part 1: Protocol specification**



Reference

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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 Signalling Protocols and Switching (SPS), and is now submitted for the Voting phase of the ETSI standards Two-step Approval Procedure.

The present document is part 1 of a multi-part standard covering the Digital Subscriber Signalling System No. one (DSS1) and Signalling System No. seven (SS7) protocols; Call forwarding on not reachable supplementary service for CTM phase 1, as described below:

Part 1: "Protocol specification";

Part 2: "Protocol Implementation Conformance Statement (PICS) proforma specification".

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

1 Scope

The present document specifies the stage 3 of the Signalling application for the mobility management service for the phase 1 of Call Forwarding on Not Reachable (CFNRc) supplementary service. The mobility management service functions include Cordless Terminal Mobility (CTM) for CTM phase 1 (DECT/GAP limitation) and DECT access to GSM via an ISDN user-network interface at the T reference point or coincident S and T reference point (as defined in ITU-T Recommendation I.411 [4]) by means of the Digital Subscriber Signalling System No. one (DSS1) protocol. Stage three identifies the protocol procedures and switching functions needed to support a telecommunication service (see CCITT Recommendation I.130 [2]).

The Call Forwarding on Not Reachable (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. After the Call Forwarding on Not Reachable (CFNRc) supplementary service has been activated, calls are forwarded only if the served user's cordless terminal is not reachable. The Call Forwarding on Not Reachable (CFNRc) supplementary service operates on all calls. The served user's ability to originate calls is in principle unaffected by the Call Forwarding on Not Reachable (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 is for example out of radio coverage.

The signalling application for phase 1 describes the mobility management procedures required to allow users of cordless terminals to be mobile within and between networks. Whenever radio coverage is provided and the cordless terminal has appropriate access rights, the user is able to make calls from and to receive calls at any location within the network.

The signalling application for phase 1 is applicable to the telephony 3,1 kHz teleservice (ETS 300 111 [7]), speech bearer service (ETS 300 109 [5]) and 3,1 kHz audio bearer service (ETS 300 110 [6]).

Further parts of EN 302 094 specify the method of testing required to identify conformance to the present document.

The present document is applicable to equipment supporting the signalling application for the alpha interface or the beta interface, to be attached at either side of a T reference point and coincident S and T reference point when used as an access to the public ISDN or GSM.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, 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] ITU-T Recommendation I.112 (1993): "Vocabulary of terms for ISDN".
- [2] CCITT Recommendation I.130 (1988): "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".
- [3] ITU-T Recommendation I.210 (1993): "Principles of telecommunication services supported by an ISDN and the means to describe them".
- [4] ITU-T Recommendation I.411 (1993): "ISDN user-network interfaces - Reference configurations".
- [5] CCITT Recommendation X.208 (1988): "Specification of Abstract Syntax Notation One (ASN.1)".

- [6] CCITT Recommendation X.219 (1988): "Remote operations: Model, notation and service definition".
- [7] ITU-T Recommendation X.880: "Information technology - Remote operations: Concepts, model and notation".
- [8] EN 300 195-1 (V1.4): "Integrated Services Digital Network (ISDN); Supplementary service interactions; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".
- [9] EN 300 196-1 (V1.2): "Integrated Services Digital Network (ISDN); Generic functional protocol for the support of supplementary services; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".
- [10] EN 300 207-1 (V1.2): "Integrated Services Digital Network (ISDN); Diversion supplementary services; Digital Subscriber Signalling No. one (DSS1) protocol; Part1: Protocol specification".
- [11] ETS 300 403-2 (1995): "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Signalling network layer for circuit-mode basic call control; Part 2: Specification Description Language (SDL) diagrams".
- [12] ETS 300 788 (1997): "Digital Enhanced Cordless Telecommunications (DECT); Global System for Mobile communications (GSM); Integrated Services Digital Network (ISDN); DECT access to GSM via ISDN; Functional capabilities and information flows".
- [13] EN 301 144-1: "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) and Signalling System No. 7 (SS7) protocols; Signalling application for the mobility management service on the alpha interface; Part 1: Protocol specification".
- [14] EN 301 175 (V1.1): "Cordless Terminal Mobility (CTM); Phase 1; Service description".
- [15] EN 300 356-15: "Integrated Services Digital Network (ISDN); Signalling System No.7; ISDN User Part (ISUP) version 3 for the international interface; Part 15: Diversion supplementary services [ITU-T Recommendation Q.732, clause 2 to 5 (1997), modified]".
- [16] ITU-T Recommendation X.680 Amendment 1 (04/95): "Information technology - Abstract Syntax Notation One (ASN.1) - Specification of basic notation Amendment 1: Rules of extensibility".

3 Definitions

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

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

(Call) forwarding: 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.

calling network: network to which the calling user is attached.

calling user: user which initiated a call that has been diverted.

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

cordless terminal mobility: ability of a cordless terminal to be mobile within and between Fixed Parts.

NOTE 1: The mobility may be continuous while the terminal is accessing and using the telecommunication services offered by the network, and it may include the capability of the networks to keep track of the cordless terminal's location throughout the entire network.

deflected-to number: ISDN number of the deflected-to user.

deflected-to user: user to which the call is redirected as a result of deflection.

deflecting number: ISDN number of the deflecting user.

deflection: see "diversion".

diversion: generic all forms of forwarding, including deflection whereby calls are redirected by the user instead of being answered.

diverted-to user: either the forwarded-to user or the deflected-to user.

diverted-to network: network to which the diverted-to user is attached.

diverted-to number: ISDN number of the forwarded-to or the deflected-to user.

diverting network: network to which the served user (diverting user) is attached.

diverting number: ISDN number of the forwarding/deflecting user.

fixed Part (FP): physical grouping that contains all elements in the cordless network between the local network and the cordless terminal air interface.

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

network: entity which provides the mobility management function and basic call functionality to the user.

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

not reachable: 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.

portable identity: identity by which a subscriber is known to the mobility management service providers and networks supporting mobility management used for flexibility and security purposes.

NOTE 2: The portable identity identifies a subscriber unambiguously. The portable identity does not need to be known by subscriber.

Portable Part (PP): physical grouping that contains all elements between the user and air interface.

NOTE 3: Portable Part is a generic term that may describe one or several physical pieces.

portable termination: logical group of functions that contains all of the CT processes and procedures on the portable side of the CT air interface.

NOTE 4: A Portable radio Termination only includes elements that are defined in the relevant CT specification.

public land mobile network: see ETS 300 788 [12].

radio coverage: 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 mobility management service.

roaming: movement of 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 mobility management service.

served user: user to which the Call Forwarding on Not Reachable (CFNRc) supplementary service is provided.

service feature: specific aspect of a telecommunication service that can also be used in conjunction with other telecommunication services or service features as parts of a commercial offering.

NOTE 5: It is either a core part of a telecommunication service or an optional part offered as an enhancement to a telecommunication service.

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

service provider: actor who offers mobility management services to its service subscribers on a contractual basis and who is responsible for the mobility management services offered.

NOTE 6: The same organization may act as a network operator and a service provider.

service subscriber: entity that contracts for services offered by a service provider.

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.

supplementary service: see ITU-T Recommendation I.210 [3], subclause 2.4.

telecommunication service: see ITU-T Recommendation I.112 [1].

terminal mobility: 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: DSS1 protocol entity at the user side of the user-network interface (EN 300 356-15 [15]).

4 Abbreviations

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

ASN.1	Abstract Syntax Notation one
CD	Call Deflection
CFB	Call Forwarding Busy
CFNR	Call Forwarding No Reply
CFNRc	Call Forwarding on Not Reachable
CFU	Call Forwarding Unconditional
CT	Cordless Terminal
CTM	Cordless Terminal Mobility
DECT	Digital Enhanced Cordless Telecommunications
DSS1	Digital Subscriber Signalling System 1
FP	Fixed Part
GAP	Generic Access Profile
GSM	Global System for Mobile communications
ISDN	Integrated Services Digital Network
LE	Local Exchange
MSC	Mobile Switching Center
PLMN	Public Land Mobile Network
PP	Portable Part
SCFNR	Selective Call Forwarding on No Reply
SDL	Specification and Description Language
TMSI	Temporary Mobile Subscriber Identity

5 Description

The Call Forwarding on Not Reachable (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. After the Call Forwarding on Not Reachable (CFNRc) supplementary service has been activated, calls are forwarded only if the served user's cordless terminal is not reachable. 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 is for example out of radio coverage.

The served user is either a Cordless Terminal (CT) using the Cordless Terminal Mobility (CTM) phase 1 user, or a GSM user, which is connected with the GSM PLMN via an ISDN user-network interface.

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.

The signalling procedures in the present document supports the Call Forwarding on Not Reachable supplementary service over the DECT air interface via the public ISDN user-network interface.

6 Operational requirements

6.1 Provision and withdrawal

The CFNRc supplementary 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. As a result of this agreement, the service provider and the involved network operators make arrangements for service provision by the network(s).

The network shall be able to maintain a service profile for the service subscriber.

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

Table 1: Subscription options for the CFNRc supplementary service

Subscription option	Value	Applicability
Served user receives notification that a call has been forwarded (note 2)	No	CFNRc
Calling User is notified of diversion (forwarded or deflected) (note 1)	No	CFNRc
	Yes, without diverted-to number	
Served user receives reminder notification on outgoing calls that forwarding is currently activated (note 3)	No	CFNRc
Diverting number is released to the diverted-to user	No	CFNRc
	Yes	
NOTE 1: These options apply on both the "CTM" mode and the "DECT access to GSM" mode.		
NOTE 2: The subscription option "Calling user is notified of diversion" with the value "yes, with diverted-to number" of EN 300 207-1 [10] is not applicable to the CFNRc supplementary service.		
NOTE 3: The subscription option "Served user receives notification that a call has been forwarded" with the value "yes, with call offering information" of EN 300 207-1 [10] is not applicable for the CFNRc supplementary service.		
NOTE 4: The subscription option "Served user receives reminder notification on outgoing calls that forwarding is currently activated" with the value "yes" of EN 300 207-1 [10] is not applicable for the CFNRc supplementary service.		

Table 2: Network provider options for the CFNRc supplementary service

Network provider option	Value	Applicability
The maximum number of diversions for a single call	Maximum number of diverted connections (with an upper limit of 5)	CFU CFB CFNR CD SCFNR CFNRc
NOTE: This network option applies on both the "CTM" mode and the "DECT access to GSM" mode.		

6.2 Requirements on the calling user's network side

The requirements at the calling user's network side are covered in clause 9.

6.3 Requirements on the served user's network side

The requirements at the served user's network side are covered in clause 9.

6.4 Requirements on the diverted-to user's network side

The requirements at the diverted-to user's network side are covered in clause 9.

7 Coding requirements

See annex B.

8 State definitions

The procedure of clause 8 of EN 301 144-1 [13] shall apply.

9 Signalling procedures at the coincident S and T reference point

- a) If the user and network support the "DECT access to GSM" mode, the following procedure shall apply:
 - the network may assign a temporary mobile subscriber identity (TMSI) by using the temporary identity assignment procedure as stated in subclause 9.3.6 of EN 300 144-1 [13].
- b) If the user and network support the "CTM" mode, the following procedures shall apply:
 - the network may initiate a key allocation procedure as stated in subclause 9.3.7 of EN 301 144-1 [13] and/or the terminal authentication procedure as stated in subclause 9.3.2 of EN 301 144-1 [13].

9.1 Registration, erasure, activation, deactivation and interrogation

9.1.1 Normal operation

Having subscribed to the CFNRc supplementary service, in order to register, erase, activate, deactivate or interrogate that service, the served user shall:

- establish a call by using the procedure as stated in subclause 9.3.9 of EN 301 144-1 [13]. No Called party number information element is provided.
- send to the network, inside this call, an EncapsulatedStimulus invoke component as described in annex B, containing, encapsulated, the keypad information received from the PP. The invoke component shall be inserted within a Facility information element in a FACILITY message to the network using the procedure described in annex E of EN 301 144-1 [13].

If the network is able to perform the required CFNRc supplementary service operation, an EncapsulatedStimulus invoke component as described in annex B, containing an indication that the required CFNRc supplementary service operation has been successfully performed, may be included within a Facility information element in a FACILITY message sent to the FP using the procedure described in annex E of EN 301 144-1 [13]. The EncapsulatedStimulus shall contain the encapsulated Display information.

9.1.2 Exceptional procedure

If the network is unable to perform the required CFNRC supplementary service operation, an EncapsulatedStimulus invoke component as described in annex B, containing an indication that the required CFNRC supplementary service operation has not been successfully performed, may be included within a facility information element in a FACILITY message sent to the FP using the procedure described in annex E of EN 301 144-1 [13]. The EncapsulatedStimulus shall contain the encapsulated Display information.

9.2 Invocation and operation

If, for an incoming call to a user having successfully activated the CFNRC supplementary service, the exceptional procedure described in subclause 9.3.10.2 of EN 301 144-1 [13] applies with one of the following return error values:

- congestion, if the fixed part is overloaded and cannot process the request;
- pagingFailure, if the paging on the air interface fails for any reason;
- radioConnectionFailure, if the signalling connection on the air interface is interrupted for any reason.

Then the CFNRC shall be invoked.

9.2.1 Collection and analysis of diversion information at the calling network

The procedure as stated in subclause 9.2.1 of EN 300 207-1 [10] shall apply.

9.2.1.1 Normal operation

The procedure as stated in subclause 9.2.1.1 of EN 300 207-1 [10] shall apply.

NOTE: The stage 1 description, EN 301 175 [14], subclause A.6.2.2.3, only considers the case where the user B1 (first diversion) is a CTM user. In case of multiple diversions, a call diversion may occur based on served users which belong to ISDN. The proposal is to act as described in EN 300 207-1 [10], considering the summarized information received of each diversion and to act accordingly.

9.2.1.2 Exceptional procedures

Not applicable.

9.2.2 Notification of diversion to the calling user

The procedure as stated in subclause 9.2.2 of EN 300 207-1 [10] shall apply.

9.2.2.1 Normal operation

The procedure as stated in subclause 9.2.2.1 of EN 300 207-1 [10] shall apply.

NOTE: Receiving the notification indication "Call is diverting" the FP should translate it into a Display information element on the radio interface.

9.2.2.2 Exceptional procedures

The procedure as stated in subclause 9.2.2.2 of EN 300 207-1 [10] shall apply.

9.2.3 Identification of the diverted-to user to the calling user

The procedure as stated in subclause 9.2.3 of EN 300 207-1 [10] shall apply.

NOTE: Where one of the diversions is CFNRc, the value of the summary condition can only be "No" or "Yes, without diverted-to number".

9.2.3.1 Normal operation

The procedure as stated in subclause 9.2.3.1 of EN 300 207-1 [10] shall apply.

9.2.3.2 Exceptional procedures

The procedure as stated in subclause 9.2.3.2 of EN 300 207-1 [10] shall apply.

9.2.4 Operation at the served user

9.2.4.1 Normal operation

No information shall be given to the served user, as the subscription option "served user receives notification that a call has been forwarded" has always the value "No".

9.2.4.2 Exceptional procedures

Not applicable.

9.2.5 Operation at the diverted-to user

The procedure as stated in subclause 9.2.5 of EN 300 207-1 [10] shall apply.

9.2.5.1 Normal operation

The procedure as stated in subclause 9.2.5.1 of EN 300 207-1 [10] shall apply.

Provision of the diverting number is not required when the diverted-to user is a CTM user. Receiving such an information, a DECT FP may ignore it or translate it into a Display information element.

9.2.5.2 Exceptional procedures

The procedure as stated in subclause 9.2.5.2 of EN 300 207-1 [10] shall apply.

9.3 Reminder notification to the served user

9.3.1 Normal operation

No reminder notification shall be sent from the network to the served user.

9.3.2 Exceptional procedures

Not applicable.

10 Procedures for interworking with private ISDNs

10.1 Procedures where a call from the public ISDN is diverted within or beyond the private ISDN

10.1.1 Normal operation

The procedure as stated in subclause 10.1.1 of EN 300 207-1 [10] shall apply with the following precisions and modifications:

- In the case of the CFNRc supplementary service, the reason for diversion shall be "unknown".

10.1.2 Exceptional procedures

The procedure as stated in subclause 10.1.2 of EN 300 207-1 [10] shall apply.

10.2 Presentation of a diverted call from a public ISDN to the private ISDN

10.2.1 Normal operation

The procedure as stated in subclause 10.2.1 of EN 300 207-1 [10] shall apply with the following precisions and modifications:

- In the case of the CFNRc supplementary service, the reason for diversion shall be "unknown".

10.2.2 Exceptional procedures

The procedure as stated in subclause 10.2.2 of EN 300 207-1 [10] shall apply.

10.3 Procedures where a call from the private ISDN is diverted within or beyond the public ISDN

The procedure as stated in subclauses 9.2.1, 9.2.2 and 9.2.3 shall apply.

10.4 Presentation of a diverted call from a private ISDN to the public ISDN

10.4.1 Normal operation

The procedure as stated in subclause 10.4.1 of EN 300 207-1 [10] shall apply with the following precisions and modifications:

- In the case of the CFNRc supplementary service, the reason for diversion shall be "unknown".

10.4.2 Exceptional procedures

The procedure as stated in subclause 10.4.2 of EN 300 207-1 [10] shall apply.

10.5 Procedures where a call from the public ISDN is diverted within or beyond the private ISDN and partial rerouting takes place in the public ISDN

10.5.1 Normal operation

The procedure as stated in subclause 10.5.1 of EN 300 207-1 [10] shall apply with the following precisions and modifications:

- In the case of the CFNRc supplementary service, the reason for diversion shall be "unknown".

10.5.2 Exceptional procedures

The procedure as stated in subclause 10.5.2 of EN 300 207-1 [10] shall apply.

10.6 Procedures where a call from the public ISDN to the private ISDN is diverted by the public ISDN

These procedures apply when the private network wishes to divert to the same alternative destination all incoming calls leading to a not reachable destination as defined in subclause 9.2.

For registration, erasure, activation, deactivation and interrogation of the CFNRc supplementary service at the T reference point, the procedures of subclause 9.1 shall apply except that they shall only be applicable for the whole private network. All requests included inside a transaction not related to the whole private network (i.e. not containing the value "NULL" in the "PortableIdentity" parameter of the CTMOutgoingCallInfo or GSMOutgoingCallInfo operation) shall be rejected according to the procedures described in subclause 9.1.2.

For invocation and operation of the CFNRc supplementary service at the T reference point, the procedures of subclause 9.2.4 shall apply.

11 Interactions with other networks

The procedure as stated in clause 11 of EN 300 207-1 [10] shall apply.

12 Interactions with other supplementary services

The interaction of the CFNRc supplementary service with other supplementary services shall be as specified in EN 300 195-1 [8].

13 Parameter values (timers)

Not applicable.

14 Dynamic description (SDL diagrams)

14.1 User side SDL process

The SDLs as described in ETS 300 403-2 [11] subclause 9.2 are used as a basis. The following subclauses specify the SDL requirements to CFNRc by means of exception text to ETS 300 403-2 [11] subclause 9.2.

14.1.1 Overlap Sending (U2) state

ETS 300 403-2 [11], subclause 9.2, state U2 shall apply with the following exceptions:

- INFO-REQUEST primitive: The INFORMATION message shall be replaced by the FACILITY Message.

14.1.2 Active State (U10) state

ETS 300 403-2 [11], subclause 9.2, state U10 shall apply with the following exceptions:

- INFO-REQUEST primitive: The INFORMATION message shall be replaced by the FACILITY Message.

14.2 Network side SDL Process

NOTE: EN 300 196-1 [9] is assumed to be supported on the network side, i.e. no changes are required.

Annex A (informative): Signalling flows

Invocation of CFNRc

The signalling flow shows the CTM mode. For the DECT access to GSM mode the message sequence is identical with the exception of OPC, which is different. For the DECT access to GSM mode the networks elements CUSF and SCF/SDF are not relevant.

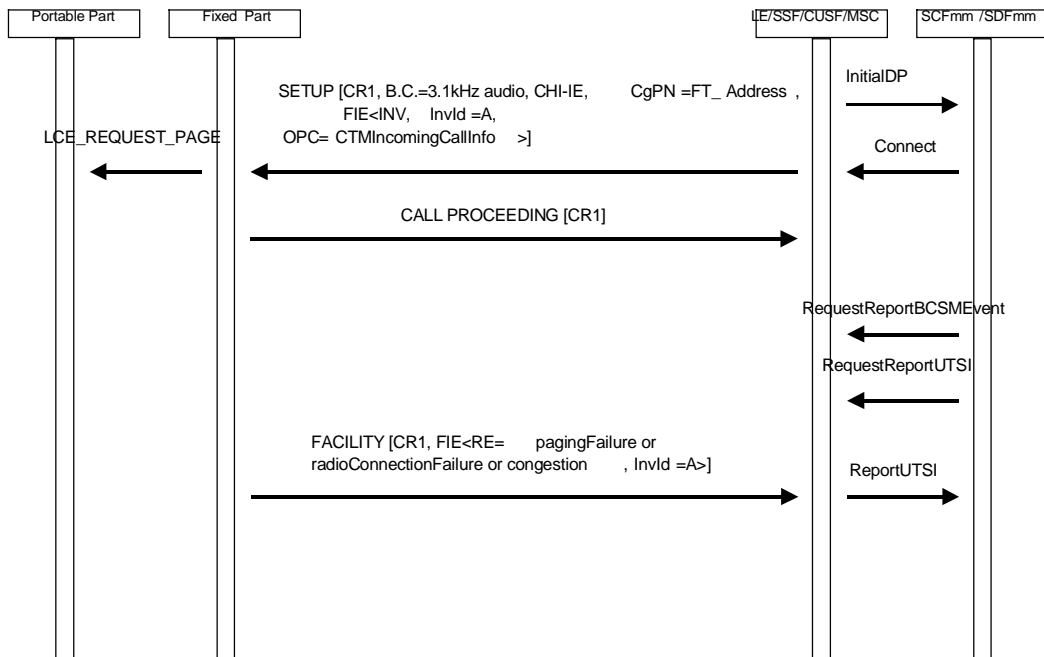
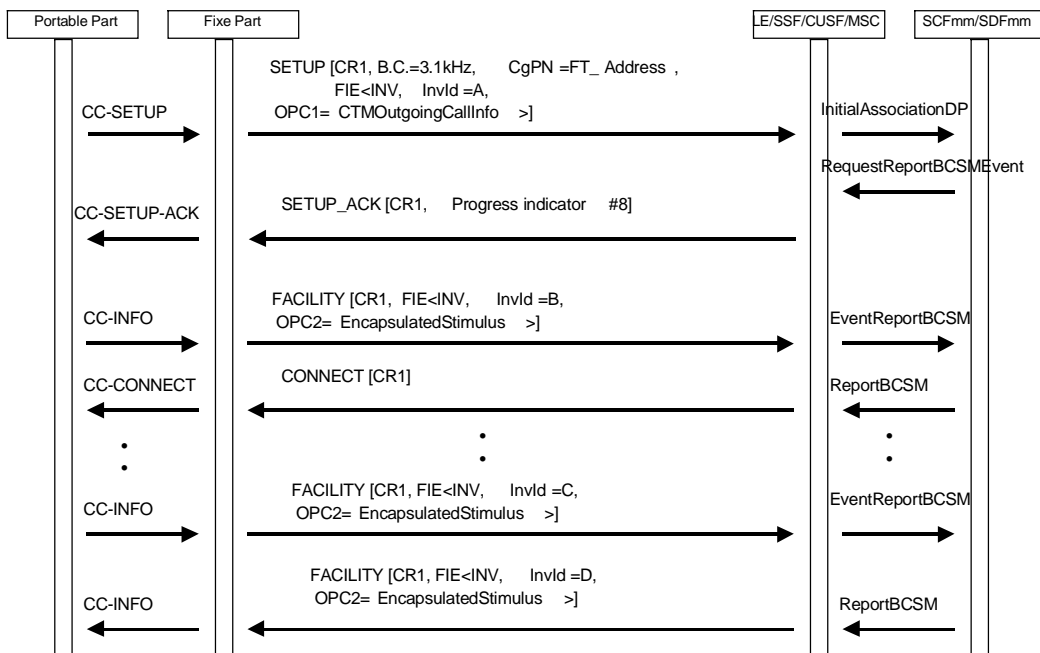


Figure A.1: Invocation of the CFNRc

Performing a CFNRc
suppl. service operation

The signalling flow shows the CTM mode. For the DECT access to GSM mode the message sequence is identical with the exception of OCP1, which is different. For the DECT access to GSM mode the networks elements CUSF and SCF/SDF are not relevant.



NOTE: It is assumed that the FP will be able to clearly distinguish between a normal call and a stimulus operation based on the keypad protocol, i.e. the first received character will be a '*' or '#'.

Figure A.2: Performing a CFNRc supplementary service operation

Annex B (normative): ROSE operation for the encapsulated generic stimulus protocol

Annex B is designed to provide the minimum requirements over and above EN 300 196-1 [9] for the ROSE operation in order to encapsulate the generic stimulus protocol.

It is intended that annex B will be removed when a later version of EN 300 196-1 [9] is developed.

Table 3 shows the definitions of the operations and errors required for the encapsulation of the generic stimulus protocol using ASN.1 as specified in ITU-T Recommendation X.208 [5] or ITU-T Recommendation X.880 [7] and using the OPERATION and ERROR macro as defined in figure 4/X.219 of ITU-T Recommendation X.219 [6] or ITU-T Recommendation X.880 [7].

The formal definitions of the component types to encode these operations and errors are provided in EN 300 196-1 [9], clause D.1.

All components (invoke, return result, return error and reject) shall be included within a Facility information element. This Facility information element may be included in any appropriate message as specified in EN 300 196-1 [9], subclause 8.3.1.1, unless a more restrictive specification is given in clause 9 of the present document.

The inclusion of the components in Facility information elements is defined in EN 300 196-1 [9], subclause 11.2.2.1.

NOTE: In order to introduce extensions to the current arguments and results, based on the ellipses notation (ITU-T Recommendation X.680 Amendment 1 (04/95) [16]), a bilateral agreement shall exist between the network and the user.

Table B.1: ASN.1 description of the operations and errors for the CFNRc supplementary service used at the coincident S and T reference point and T reference point

```

CallForwardingOnNotReachable-Operations-and-Errors {ccitt identified-organisation etsi(0) 2094
operations-and-errors(1)}

DEFINITIONS IMPLICIT TAGS ::=

BEGIN

EXPORTS      EncapsulatedStimulus

IMPORTS      OPERATION
             FROM Remote-Operation-Notation
             {joint-iso-ccitt remote-operations(4) notation(0)}

EncapsulatedStimulus ::= OPERATION
ARGUMENT EncapsulatedStimulusArg EncapsulatedStimulusArg
-- End of EncapsulatedStimulus operation definition

EncapsulatedStimulusArg ::= CHOICE {
                                keypad [0] IMPLICIT KeypadIE,
                                display [1] IMPLICIT DisplayIE
--,
}
KeypadIE ::= SEQUENCE {
             keypadInf [0] KeypadInf
--,
}
DisplayIE ::= SEQUENCE {
             displayInf [0] DisplayInf
--,
}

KeypadInf ::= VisibleString (SIZE(1..34)) (FROM
("0"|"1"|"2"|"3"|"4"|"5"|"6"|"7"|"8"|"9"|"*"|"#"))

DisplayInf ::= VisibleString (SIZE (1..82))

cFNRCOID OBJECT IDENTIFIER ::= {ccitt identified-organization etsi (0)
                                (2094) operations-and-errors(1)}
--

encapsulatedStimulus EncapsulatedStimulus ::= globalValue {cFNRCOID 1}

END -- of CallForwardingOnNotReachable-Operations-and-Errors

```

Bibliography

The following material, though not specifically referenced in the body of the present document (or not publicly available), gives supporting information.

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History

Document history				
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