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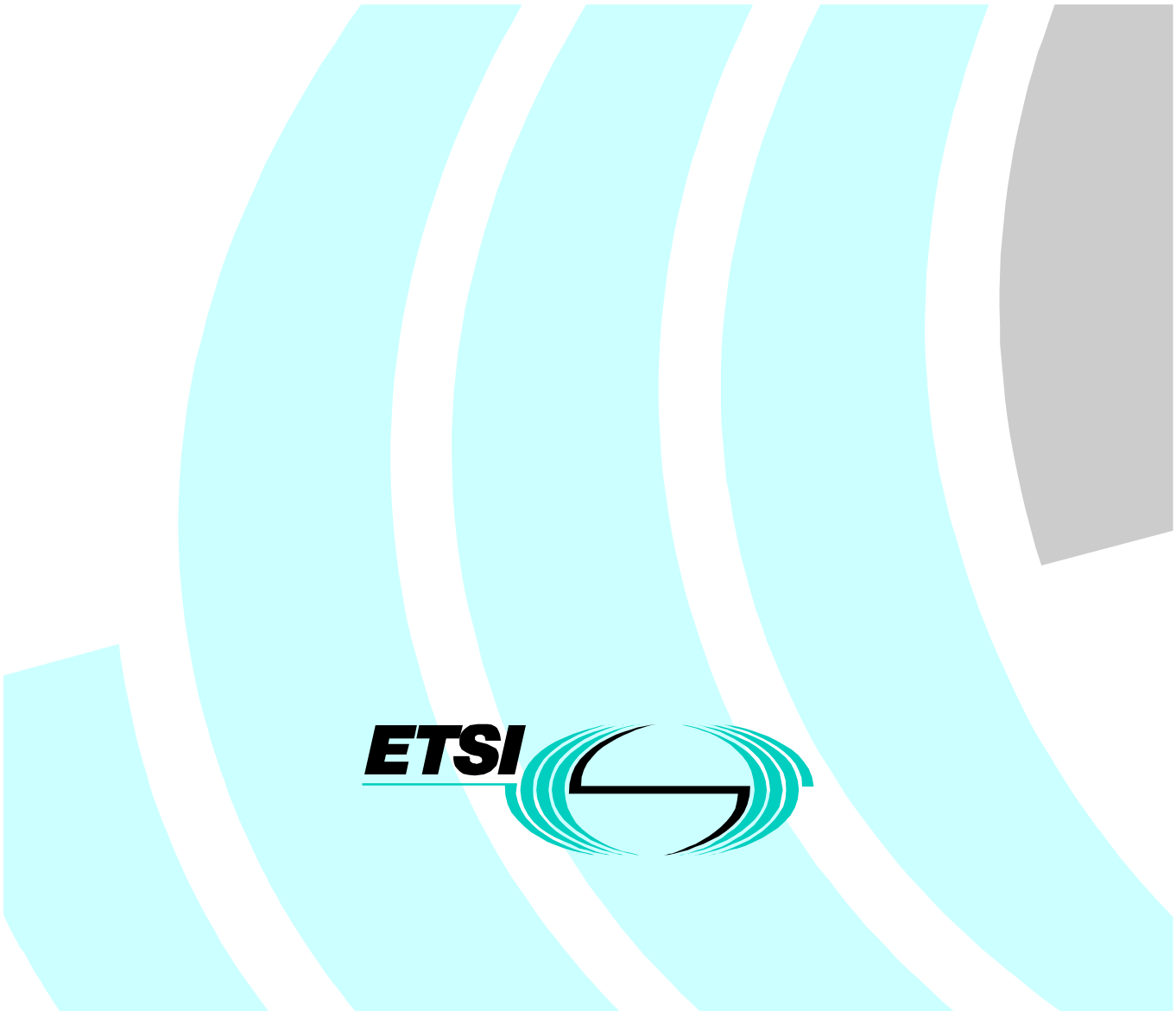
Digital Enhanced Cordless Telecommunications (DECT); Cordless Terminal Mobility (CTM); CTM Access Profile (CAP)



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Contents

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Project Digital Enhanced Cordless Telecommunications (DECT).

The present document is based on EN 300 175, parts 1 to 8 [1] to [8] and EN 300 444 [12].

National transposition dates	
Date of adoption of this EN:	10 August 2001
Date of latest announcement of this EN (doa):	30 November 2001
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1 Scope

The present document specifies that set of technical requirements for Digital Enhanced Cordless Telecommunications (DECT) Fixed Part (FP) and DECT Portable Part (PP) necessary for the support of the Cordless Terminal Mobility (CTM) Access Profile (CAP).

The objective of the present document is to ensure the air interface interoperability of DECT CAP PPs and DECT CAP FPs if applied.

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 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 present document covers the DECT access requirements for CTM phase 2 as defined in the CTM phase 2 service description, EN 301 273 [14].

The main objectives of the CAP are:

- maintain compatibility with the DECT Generic Access Profile (GAP), identifying only components not mandatory in the GAP to be added to obtain capabilities needed in the CTM context;
- maintain compatibility with EN 300 175 parts 1 to 8 [1] to [8], for procedures not defined in the GAP.

The CTM access profile is seen as an extension of the GAP mandatory base covering the requirements for CTM phase 2.

CAP supports telephony teleservice and provides 32 kbit/s Adaptive Differential Pulse Code Modulation (ADPCM) speech bearer service.

CTM supplementary services with no impact on the air interface are not considered in the CAP.

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 and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

[1] ETSI EN 300 175-1: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 1: Overview".

[2] ETSI EN 300 175-2: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 2: Physical layer (PHL)".

[3] ETSI EN 300 175-3: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 3: Medium Access Control (MAC) layer".

[4] ETSI EN 300 175-4: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 4: Data Link Control (DLC) layer".

[5] ETSI EN 300 175-5: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 5: Network (NWK) layer".

[6] ETSI EN 300 175-6: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 6: Identities and addressing".

[7] ETSI EN 300 175-7: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 7: Security features".

[8] ETSI EN 300 175-8: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 8: Speech coding and transmission".

[9] ETSI ETS 300 176: "Digital Enhanced Cordless Telecommunications (DECT); Approval test specification".

[10] ETSI TBR 6: "Digital Enhanced Cordless Telecommunications (DECT); General terminal attachment requirements".

[11] ETSI TBR 10 (1997): "Digital Enhanced Cordless Telecommunications (DECT); General terminal attachment requirements; Telephony applications".

[12] ETSI EN 300 444: "Digital Enhanced Cordless Telecommunications (DECT); Generic Access Profile (GAP)".

[13] ETSI TBR 22: "Radio Equipment and Systems (RES); Attachment requirements for terminal equipment for Digital Enhanced Cordless Telecommunications (DECT) Generic Access Profile (GAP) applications".

[14] ETSI EN 301 273: "Cordless Terminal Mobility (CTM); Phase 2; Service description".

[15] ETSI EN 300 745-1: "Integrated Services Digital Network (ISDN); Message Waiting Indication (MWI) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[16] ISO/IEC 9646-7 (1995): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".

[17] ETSI EN 300 196-1: "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".

3 Definitions, symbols and abbreviations

3.1 Definitions

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

attach: process whereby a PP within the coverage area of a FP to which it has access rights, notifies this FP that it is operative. The reverse process is detach, which reports the PP as inoperative

NOTE 1: An operative PP is assumed to be ready to receive calls.

authentication: process whereby a CTM subscriber is positively verified to be a legitimate user of the CTM service

NOTE 2: Authentication is generally performed at call set-up, but may also be done at any other time (e.g. during a call).

bearer service: type of telecommunication service that provides a defined capability for the transmission of signals between user-network interfaces

NOTE 3: The DECT user-network interface corresponds to the top of the network layer (layer 3).

C-plane: control plane of the DECT protocol stacks, which contains all of the internal DECT protocol control, but may also include some external user information

NOTE 4: The C-plane stack always contains protocol entities up to and including the network layer.

call: all of the Network (NWK) layer processes involved in one network layer peer-to-peer association

NOTE 5: Call may sometimes be used to refer to processes of all layers, since lower layer processes are implicitly required.

DECT network: network that uses the DECT air interface to interconnect a local network to one or more portable applications. The logical boundaries of the DECT network are defined to be at the top of the DECT network layer

NOTE 6: A DECT network is a logical grouping that contains one or more fixed radio terminations plus their associated portable radio termination. The boundaries of the DECT network are not physical boundaries.

external handover: process of switching a call in progress from one fixed part to another fixed part

Fixed Part (DECT Fixed Part) (FP): physical grouping that contains all of the elements in the DECT network between the local network and the DECT air interface

NOTE 7: A DECT FP contains the logical elements of at least one FT, plus additional implementation specific elements.

Fixed radio Termination (FT): logical group of functions that contains all of the DECT processes and procedures on the fixed side of the DECT air interface

NOTE 8: A FT only includes elements that are defined in the DECT Common Interface (CI) standard. This includes radio transmission elements together with a selection of layer 2 and layer 3 elements.

geographically unique identity: term relates to FP identities, Primary Access Rights Identities (PARIs) and Radio Fixed Part Identities (RFPIs). It indicates that two systems with the same PARI, or respectively two Radio Fixed Parts (RFPs) with the same RFPI, can not be reached or listened to at the same geographical position

NOTE 9: For PARI and RFPI see abbreviations.

global network: telecommunication network capable of offering a long distance telecommunication service

NOTE 10: The term does not include legal or regulatory aspects, nor does it indicate if the network is a public or a private network.

globally unique identity: identity is unique within DECT (without geographical or other restrictions)

handover: process of switching a call in progress from one physical channel to another physical channel

NOTE 11: There are two physical forms of handover, intra-cell handover and inter-cell handover.

incoming call: call received at a PP

inter-cell handover: switching of a call in progress from one cell to another cell

internal handover: handover processes that are completely internal to one FT. Internal handover reconnects the call at the lower layers, while maintaining the call at the NWK layer

NOTE 12: The lower layer reconnection can either be at the Data Link Control (DLC) layer (connection handover) or at the MAC layer (bearer handover).

interoperability: capability of FPs and PPs, that enable a PP to obtain access to teleservices in more than one location area and/or from more than one operator (more than one service provider)

interoperator roaming: roaming between FP coverage areas of different operators (different service providers)

Interworking Unit (IWU): unit that is used to interconnect sub networks

NOTE 13: The IWU will contain the interworking functions necessary to support the required sub network interworking.

intra-cell handover: switching of a call in progress from one physical channel of one cell to another physical channel of the same cell

intraoperator roaming: roaming between different FP coverage areas of the same operator (same service provider)

Local Network (LNW): telecommunication network capable of offering local telecommunication services

NOTE 14: The term does not include legal or regulatory aspects, nor does it indicate if the network is a public network or a private network.

locally unique identity: unique identity within one FP or location area, depending on application

location area: domain in which a PP may receive (and/or make) calls as a result of a single location registration

location registration: process whereby the position of a DECT PT is determined to the level of one location area, and this position is updated in one or more databases

NOTE 15: These databases are not included within a DECT FT.

MAC Connection (CONNECTION): association between one source MAC Multi-Bearer Control (MBC) entity and one destination Medium Access Control (MAC) Multi-Bearer Control (MBC) entity

NOTE 16: This provides a set of related MAC services (a set of logical channels), and it can involve one or more underlying MAC bearers.

outgoing call: call originating from a PP

Portable Application (PA): logical grouping that contains all the elements that lie beyond the DECT network boundary on the portable side

NOTE 17: The functions contained in the PA may be physically distributed, but any such distribution is invisible to the DECT network.

Portable Part (DECT Portable Part) (PP): physical grouping that contains all elements between the user and the DECT air interface. PP is a generic term that may describe one or several physical pieces

NOTE 18: A DECT PP is logically divided into one PT plus one or more PAs.

Portable radio Termination (PT): logical group of functions that contains all of the DECT processes and procedures on the portable side of the DECT air interface

NOTE 19: A PT only includes elements that are defined in the DECT CI standard. This includes radio transmission elements (layer 1) together with a selection of layer 2 and layer 3 elements.

Radio Fixed Part (RFP): physical sub-group of a FP that contains all the radio end points (one or more) that are connected to a single system of antennas

roaming: movement of a PP from one FP coverage area to another FP coverage area, where the capabilities of the FPs enable the PP to make or receive calls in both areas

NOTE 20: Roaming requires the relevant FPs and PP to be interoperable.

subscription registration: infrequent process whereby a subscriber obtains access rights to one or more FPs

NOTE 21: Subscription registration is usually required before a user can make or receive calls.

supplementary service: service that modifies or supplements a basic telecommunications service

teleservice: type of telecommunications service that provides the complete capability, including terminal equipment functions, for communication between users, according to protocols that are established by agreement

3.2 Symbols

For the purposes of the present document, the following symbols apply.

The symbols defined in this clause are applied for procedures, features, and services in the present document if not explicitly otherwise stated. The interpretation of status columns in all tables is as follows:

M	for mandatory to support (provision mandatory, process mandatory)
O	for optional to support (provision optional, process mandatory)
I	for out-of-scope (provision optional, process optional) not subject for testing

C	for conditional to support (process mandatory)
N/A	for not-applicable (in the given context the specification makes it impossible to use this capability)

Provision mandatory, process mandatory means that the indicated feature, service or procedure shall be implemented as described in the present document, and may be subject to testing.

Provision optional, process mandatory means that the indicated feature, service or procedure may be implemented, and if implemented, the feature, service or procedure shall be implemented as described in the present document, and may be subject to testing.

NOTE: The used notation is based on the notation proposed in ISO/IEC 9646-7 [16].

3.3 Abbreviations

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

ADPCM	Adaptive Differential Pulse Code Modulation
ARC	Access Rights Class
ARD	Access Rights Details
ARI	Access Rights Identity
B	Business (environment)
CAP	CTM Access Profile
CC	Call Control
CI	Common Interface
CLIP	Calling Line Identification Presentation
CTM	Cordless Terminal Mobility
DECT	Digital Enhanced Cordless Telecommunications
DLC	Data Link Control
EMC	Equipment Manufacturer Code
FP	Fixed Part
FT	Fixed radio Termination
GAP	Generic Access Protocol
IE	Information Element
IPEI	International Portable Equipment Identity
IPUI	International Portable User Identity
ISDN	Integrated Services Digital Network
IWU	Interworking Unit
LA	Location Area
LAI	Location Area Identification
LAL	Location Area Level
LCE	Link Control Entity
LNW	Local Network
MAC	Medium Access Control
MBC	Multi-Bearer Control
MM	Mobility Management, a NWK layer functional grouping
MWI	Message Waiting Indication
NWK	Network, Layer 3 of the DECT protocol stack
P	Public (environment)
PA	Portable Application
PARI	Primary Access Rights Identity
PARK	Portable Access Rights Key
PHL	Physical Layer
PLI	Park Length Indicator
PMID	Portable part MAC Identity
PP	Portable Part
PSN	Portable equipment Serial Number
PT	Portable radio Termination
PUN	Portable User Number
PUT	Portable User Type
RES	A Response calculated by a PP
RFP	Radio Fixed Part
RFPI	Radio Fixed Part Identity

R	Residential (environment)
SAP	Service Access Point
SARI	Secondary Access Rights Identity
TARI	Tertiary Access Rights Identity
TPUI	Temporary Portable User Identity

4 Introduction

This profile is an extension of EN 300 444 [12] covering the requirements for CTM phase 2.

In the following clauses only differences with respect to EN 300 444 [12] are explicitly mentioned.

5 Feature definitions

For the purposes of the present document, the feature definitions in the following clauses apply.

The reference given in parentheses after the name of a feature is the item reference used in the tables of the present document.

5.1 Network (NWK) features

The following differences from the GAP are applicable.

DECT external handover (CAP-N.1): External handover is the process of switching a call in progress from one Fixed Part (FP-1) to another Fixed Part (FP-2). This means the handover occurs between two independent systems, where each system has its own lower layers of protocol and has an independent set of network layer Service Access Points (SAPs). To make external handover possible, a common management entity above the two fixed terminations is necessary.

Emergency call (CAP-N.2): This service feature enables a user to make an emergency call even without a valid subscription, i.e. a fast and easy means of giving information about an emergency situation to the appropriate emergency organization (e.g. fire service, police and ambulance).

Display management (CAP-N.3): This feature enables a user to receive short alphanumeric indications displayed on the screen terminal. These indications could be associated with supplementary or value added services.

Message waiting indication (CAP-N.4): This feature enables a user to receive an indication of the status of a message server (e.g. a voice mailbox) to which the user has access.

Detach (CAP-N.5): This feature enables a PT to report to the FT that the PT is not ready to receive calls.

Enhanced location registration (CAP-N.6): This feature enables automatic location registration of PT at expected intervals of time.

On-air modification of user parameters (CAP-N.7): This feature enables the FT to modify the active subscription data of the PT.

5.1.1 Application features

See EN 300 444 [12].

6 Service definitions

For the purposes of the present document, the following service definitions apply.

6.1 DLC service definitions

See EN 300 444 [12].

6.2 Medium Access Control (MAC) service definitions

The following differences from the GAP are applicable.

Tertiary Access Rights Identity (TARI) support (CAP-M.1): The ability to support in addition to the primary Access Rights Identity (ARI) and secondary ARIs tertiary ARIs that the FT does not broadcast and are only available to PT as a Yes/No answer upon a request including the wanted ARI. These may be used to reflect an inter-operators agreement allowing a portable to access more than one operator or services through FT.

RFP status (CAP-M.2): A service which indicates to the PP the status (busy or clear) of the RFP or the system (FP).

Extended fixed part capabilities (CAP-M.3): A service which indicates to the PP the extended capabilities of the FP.

Prolonged preamble diversity in RFP (CAP-M.4): The ability of the RFP to support antenna diversity based on the reception of a prolonged preamble.

Prolonged preamble diversity in PP (CAP-M.5): The ability of the PP to support antenna diversity based on the reception of a prolonged preamble.

Prolonged preamble transmission of the RFP (CAP-M.6): The ability of the RFP to transmit prolonged preamble if the PP supports prolonged preamble diversity.

Prolonged preamble transmission of the PP (CAP-M.7): The ability of the PP to transmit prolonged preamble if the RFP supports prolonged preamble diversity.

7 Interoperability requirements

7.1 General

The tables listed in this clause define all the protocol elements i.e. features, services, and procedures which are mandatory, optional, and conditional under the provision of another protocol element, or out of the scope of the present document, or in some context not-applicable according to the definition of the status column as defined in clause 3.3 for the CAP FP and PP. All optional elements shall be process mandatory according to the procedures described in the present document.

Protocol elements defined as mandatory, optional or conditional in this clause shall further be defined in clauses 8 to 15 in detail either explicitly and/or as references to the DECT base standard, EN 300 175 part 2 [2] to part 8 [8] and ETS 300 176 [9].

The requirements of TBR 6 [10], TBR 10 [11] and TBR 22 [13] shall be met by all equipment conforming to the present document.

7.2 NWK features

Table 1: NWK features status

Feature supported							
				Status			
Item no.	Name of feature	CAP Ref.	GAP Ref.	PT	FT		
					R	B	P
N.11	Location registration		4.1	M	O	M	M
N.20	Terminate access rights FT initiated		4.1	M	O	O	M
N.30	Calling Line Identification Presentation (CLIP)		4.1	M	O	O	M
CAP-N.1	DECT External handover	5.1		M	O	O	M
CAP-N.2	Emergency call	5.1		M	O	O	M
CAP-N.3	Display Management	5.1		M	O	O	M
CAP-N.4	Message Waiting Indication	5.1		M	O	O	M
CAP-N.5	Detach	5.1		M	O	O	M
CAP-N.6	Periodic location registration	5.1		M	O	O	M
CAP-N.7	On-air modification of user parameters	5.1		M	O	O	O

7.3 DLC services

See clause 6.3 of EN 300 444 [12].

7.4 MAC services

Table 2: MAC services status

Service supported							
				Status			
Item no.	Name of service	CAP Ref.	GAP Ref.	PT	FT		
					R	B	P
CAP-M.1	TARI support	6.2		O	O	O	O
CAP-M.2	RFP status	6.2		M	O	M	M
CAP-M.3	Extended fixed part capabilities	6.2		M	O	O	M
CAP-M.4	Prolonged preamble diversity in RFP	6.2		N/A	O	O	O
CAP-M.5	Prolonged preamble diversity in PP	6.2		O	N/A	N/A	N/A
CAP-M.6	Prolonged preamble transmission in RFP	6.2		N/A	O	O	O
CAP-M.7	Prolonged preamble transmission in PP	6.2		M	N/A	N/A	N/A

7.5 Physical Layer (PHL) services

See clause 6.5 of EN 300 444 [12].

7.6 Application features

See clause 6.6 of EN 300 444 [12].

7.7 NWK feature to procedure mapping

Table 3: NWK feature to procedure mapping

Feature/Procedure mapping							
				Status			
Feature	**Procedure**	**CAP Ref.**	**GAP Ref.**	**PT**	**FT**		
					R	**B**	**P**
N.11 Location registration			4.1	M	O	M	M
N.20 Terminate access rights FT initiated			4.1	M	O	O	M
	FT authentication		8.23	M	M	M	M
N.30, Calling Line Identification Presentation (CLIP)			4.1	M	O	O	M
	Incoming call request		8.12	M	M	M	M
CAP-N.1, DECT External handover		5.1		M	O	O	M
	Handover candidate indication	9.1.1.1		M	M	M	M
	Handover candidate retrieval	9.1.1.2		M	O	O	O
	Target FP selection	9.1.2		M	N/A	N/A	N/A
	Handover reference indication	9.1.3.1		M	C1	C1	C1
	Handover reference retrieval	9.1.3.2		M	C2	C2	C2
	External handover call set-up	9.1.4		M	M	M	M
	Ciphering procedure PT initiated	9.1.5.1		O	C3	C3	C3
	Ciphering procedure FT initiated	9.1.5.2		M	C4	C4	M
	U-plane handling	9.1.6		M	O	M	M
CAP-N.2, Emergency call		5.1		M	O	O	M
	Emergency call set-up	9.2		M	M	M	M
CAP-N.3, Display Management		5.1		M	O	O	M
	Display	9.3		M	M	M	M
	Terminal capability indication	9.4		M	M	M	M
CAP-N.4, Message Waiting Indication		5.1		M	O	O	M
	Message waiting indication	9.7		M	M	M	M
CAP-N.5, Detach		5.1		M	O	O	M
	Detach	9.5		M	M	M	M
CAP-N.6, Periodic location registration		5.1		M	O	O	M
	Enhanced location registration	9.6		M	M	M	M
CAP-N.7, On-air modification of user parameters		5.1		M	O	O	O
	On-air modification of user parameters	9.8		M	M	M	M
	FT authentication		8.23	M	M	M	M
C1 IF procedure 9.1.3.2 supported THEN O ELSE M. C2 IF procedure 9.1.3.1 supported THEN O ELSE M. C3 IF feature N.27 of EN 300 444 [12] THEN M ELSE O. C4 IF feature N.17 of EN 300 444 [12] THEN M ELSE O.							

7.8 Service to procedure mapping

7.8.1 DLC service to procedure mapping

See clause 6.8.1 of EN 300 444 [12].

7.8.2 MAC service to procedure mapping

Table 4: MAC service to procedure mapping

Service/Procedure mapping							
				Status			
Service	Procedure	CAP Ref.	GAP Ref.	PT	FT		
					R	B	P
CAP-M.1 TARI support		6.2		O	O	O	O
	Non-continuous broadcast	11.3		M	M	M	M
CAP-M.2 RFP status		6.2		M	O	M	M
	RFP status	11.4		M	M	M	M
CAP-M.3 Extended fixed part capabilities		6.2		M	O	O	M
	Extended fixed part capabilities	11.5		M	M	M	M
CAP-M.4. Prolonged preamble diversity in RFP		6.2		N/A	O	O	O
	Prolonged preamble diversity in RFP and prolonged preamble transmission in PP	11.6.1		N/A	M	M	M
CAP-M.5. Prolonged preamble diversity in PP		6.2		O	N/A	N/A	N/A
	Prolonged preamble diversity in PP and prolonged preamble transmission in RFP	11.6.2		M	N/A	N/A	N/A
CAP-M.6. Prolonged preamble transmission in RFP		6.2		N/A	O	O	O
	Prolonged preamble diversity in PP and prolonged preamble transmission in RFP	11.6.2		N/A	M	M	M
CAP-M.7. Prolonged preamble transmission in PP		6.2		M	N/A	N/A	N/A
	Prolonged preamble diversity in RFP and prolonged preamble transmission in PP	11.6.1		M	N/A	N/A	N/A

7.8.3 Application feature to procedure mapping

Table 5: Application feature to procedure mapping

Feature/Procedure mapping							
				Status			
Feature	Procedure	CAP Ref.	GAP Ref.	PT	FT		
					R	B	P
A.2 Multiple subscription registration			4.2	M	N/A	N/A	N/A
	Subscription control	15.2	14.1	M	N/A	N/A	N/A

7.9 General requirements

See clauses 6.9.1 to 6.9.7 of EN 300 444 [12].

7.9.1 Coexistence of MM and CC procedures

In addition to clause 6.9.6 of EN 300 444 [12], the following definition regarding features (CAP-N.5) and (CAP-N.7) shall apply.

Table 6

Feature	Procedure	Mandatory support in CC state
(CAP-N.5)	Detach	All states
(CAP-N.7)	On-air modification of user parameters	T (F) -00

8 Procedure description

Clauses 9 to 15 define the process mandatory procedures which are in the scope of the CAP. Each procedure (if appropriate) is divided into three parts:

a) normal (i.e. successful case). This part defines the functions and respective protocol element values in normal operation;

b) associated procedure(s). This is an integral part of the actual procedure (if defined in the present document) i.e. if a procedure is being declared to be supported, the respective entity shall also support the associated procedures, e.g. timer management, in the clause following the description of the normal case;

c) exceptional case(s). This is an integral part of the actual procedure (if defined in the present document) i.e. if a procedure is being declared to be supported, the respective entity shall also support the exception handling defined in the clause following the description of the normal case.

All protocol elements listed in the following clauses are process mandatory i.e. the FT and PT depending on their role in the procedure shall send or shall be capable of receiving and processing the relevant protocol elements as listed in the respective tables if not explicitly stated as being optional.

The primitives used in procedure descriptions are defined only for the purpose of describing layer-to-layer interactions. The primitives are defined as an abstract list of parameters, and their concrete realization may vary between implementations. No formal testing of primitives is intended. The primitive definitions have no normative significance.

9 NWK layer procedures

This clause specifies the NWK layer procedures, messages and IEs required in the CAP.

This profile does not prevent any PT or FT transmitting or receiving and processing any other NWK layer message or IE not specified in the profile. A PT or FT receiving an unsupported NWK layer message or IE which it does not recognize shall ignore it, as specified in clause 17 of EN 300 175-5 [5].

9.1 External handover procedures

9.1.1 Handover candidate procedure

FP-1 shall only indicate handover candidates to which the PP has access using its active subscription.

Furthermore, the indicated candidates shall support External handover from the current FP. If the current FP supports encryption, then the FP shall ensure that the indicated candidate FPs support encryption.

NOTE: The above implies that the PP does not need to analyse the Secondary Access Rights Identities (SARIs) and/or TARIs supported by FP-2 prior to attempting external handover. Likewise, the PP need not analyse the external handover nor the ciphering support bit broadcasted by FP-2 prior to attempting external handover.

9.1.1.1 Handover candidate indication

The procedure shall be performed as defined in clause 15.7.1.2 of EN 300 175-5 [5]. The following text together with the associated clauses define the mandatory requirements with regard to the present document.

The FP shall provide the <<ext_h/o_indicator>> in {CC-SETUP}, {CC-SETUP-ACK}, {CC-CONNECT} or {CC-INFO}. The indicated handover candidates are valid until the release of the call or until the successful completion of an external handover.

In case of external handover, FP-2 shall send the <<ext_h/o_indicator>> i.e. within a CC-INFO message after successful completion of the external handover procedure. Only one value is requested to be stored in the PP.

The PP shall be able to perform external handover between FPs which indicate 2 or 3 in the <SYNC> field of the <<ext_h/o_indicator>>.

NOTE: Successful completion of an external handover means, that the handover has been accepted as defined in clause 15.7.4.3 of EN 300 175-5 [5].

Table 7: Coding of <<Ext h/o indicator>> in call establishment CC messages

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<Ext h/o indicator>>			
	<OID>	0	Other fixed part IDs not available using parameter retrieval procedure
		1	Other fixed part IDs available using parameter retrieval procedure
	<SYNC>	All	
	<Length indicator>	All	

9.1.1.2 Handover candidate retrieval

The procedure shall be performed as defined in clause 15.7.1.3 of EN 300 175-5 [5]. The following text together with the associated clauses define the mandatory requirements with regard to the present document.

The PP shall not invoke this procedure if the <<ext h/o indicator>> has not yet received or if the <<ext h/o indicator>> has been received with the OID value set to "0".

If the PP sends a {MM-INFO-REQUEST} message with an <<info type>> IE indicating "external handover parameters", the FP shall also include a handover reference in a <<network parameter>> IE unless the handover reference is not required. In this case the FP shall inform the PP including in the response a <<network parameter>> IE with the value "handover reference not required".

The <<Info type>> shall always be included into the {MM-INFO-ACCEPT} message indicating what type of synchronization the suggested Fixed Parts have. If more than one Fixed part is indicated, all of them shall have at least the type of synchronization, requested in the <<Info type>>.

Table 8: Values used within the {MM-INFO-REQUEST} message

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<Info type>>			
	<ext>	1	Only one parameter per information element
	<Parameter type>	8	External handover parameters
		11	Multiframe and PSCN synchronized external handover candidate
		12	External handover candidate
		13	Multiframe synchronized external handover candidate
		14	Non synchronized external handover candidate
		15	Multiframe, PSCN and multiframe number synchronized external handover candidate

If more than one FP is indicated in the {MM-INFO-ACCEPT} message, the type of synchronization indicated in the MM <<info type>> shall reflect the lowest type of synchronization supported by all FP.

Table 9: Values used within the {MM-INFO-ACCEPT} message

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<Info type>>			
	<ext>	1	Only one parameter per information element
	<Parameter type>	8	External handover parameters
		11	Multiframe and PSCN synchronized external handover candidate
		12	External handover candidate
		13	Multiframe synchronized external handover candidate
		14	Non synchronized external handover candidate
		15	Multiframe, PSCN and multiframe number synchronized external handover candidate
<<Repeat indicator>>			
	<Repeat Indicator Coding>	1	Non prioritized list

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<Fixed Identity>>			When <<Repeat indicator>> is included more than 1 <<Fixed Identity>> IEs will be included
	<Type>	0	ARI which is transmitted as PARI
		32	PARK
	<Length of identity value>	All	Related to the type
	<Identity Value>	All	Type and Area dependent
<<Network Parameter>>			Whether to be included depends on the PT request
	<Discriminator>	104 to 107	Dependent on the Network requirements
	<Data>	All	PT is not required to store more than 10 octets

9.1.1.2.1 Exceptional cases

9.1.1.2.1.1 Failure of the PP handover candidate retrieval attempt

Upon receipt of a {MM_INFO_REJECT} or when an indication for link release is received from the DLC layer or upon expiry of P-<MM_info.1>, the PP shall consider the procedure as failed. For target FP selection, the PP shall then either:

- use the <length indicator> as received during handover candidate indication; or
- repeat the handover candidate retrieval procedure.

Table 10: Values used within the {MM_INFO_REJECT} message

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
			All out of scope

9.1.2 Target FP selection

The procedure shall be performed as defined in clause 15.7.1.4 of EN 300 175-5 [5]. The following text together with the associated clauses define the mandatory requirements with regard to the present document.

If the handover candidate retrieval procedure is not allowed (OID = 0) or the PP has already detected some candidates for handover, the PP determines which FPs it may attempt external handover to by comparing the PARI of the FP in use with the PARIs of candidate FPs and determining if they match in the bits indicated by the <<ext h/o length indicator>> derived from the "ext h/o indicator" IE.

9.1.3 Handover reference procedure

9.1.3.1 Handover reference indication

The procedure shall be performed as defined in clause 15.7.2.2 of EN 300 175-5 [5].

9.1.3.2 Handover reference retrieval

The procedure shall be performed as defined in clause 15.7.2.3 of EN 300 175-5 [5]. The following text together with the associated clauses define the mandatory requirements with regard to the present document.

If the PP has not received the <<network parameter>> indicating "handover reference not required" and has not received the <<network parameter>> in a CC message it shall perform the handover reference retrieval procedure as soon as the call enters in the active state to give the time to the current FP to send the answer before the connection is lost.

The <<info type>> value used by the PP to request the procedure may be both "handover reference" or "external handover parameters". When a FP that has sent the "OID" bit set to 0 receives the {MM-INFO-REQUEST} with the <<info type>> value set to "external handover parameters" it responds by sending only the handover reference within a <<network parameter>> to the PP.

When the FP has set the OID-bit to "1" and receives a {MM-INFO-REQUEST} message with an <<info type>> IE indicating "external handover parameters", the FP shall also include one or more <<fixed-identity>> IEs to identify to which FP the external handover may be attempted.

If the "handover reference" is not required by the FP, the FP shall inform the PP by including in the response a <<network parameter>> IE with the value "handover reference not required".

Regardless of whether the indication or the retrieval procedure is used, the provided handover reference value is valid until the release of the call.

By default, the handover value remains valid after the successful completion of an external handover. In case updating of the handover reference value is desired upon external handover, FP-2 should indicate a new value within a CC-INFO message following the CC-CONNECT-ACK message.

Table 11: Values used within the {MM-INFO-REQUEST} message

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<Info type>>			
	<ext>	1	Only one parameter per information element
	<Parameter type>	8	External handover parameters
		10	Handover reference

Table 12: Values used within the {MM-INFO-ACCEPT} message

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<Info type>>			Included if FT provides as well the <<Fixed Identity>> IE
	<ext>	1	Only one parameter per information element
	<Parameter type>	11	Multiframe and PSCN synchronized external handover candidate
		12	External handover candidate
		13	Multiframe synchronized external handover candidate
		14	Non synchronized external handover candidate
		15	Multiframe, PSCN and multiframe number synchronized external handover candidate
<<Repeat indicator>>			Shall be Included if FT provides more than 1 <<Fixed Identity>> IE
	<Repeat Indicator Coding>	1	Non prioritized list
<<Fixed Identity>>			Included if the FP has set the OID-bit to "1" and receives a {MM-INFO-REQUEST} message with an <<Info-type>> IE indicating "external handover parameters". When <<Repeat indicator>> is included more than 1 <<Fixed Identity>> IEs will be included
	<Type>	0	ARI which is transmitted as PARI
		32	PARK
	<Length of identity value>	All	Related to the type
	<Identity Value>	All	Type and Area dependent

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<Network Parameter>>			
	<Discriminator>	104 to 107	Dependent on the Network requirements
	<Data>	All	PT is not required to store more than 10 octets

9.1.3.2.1 Exceptional cases

9.1.3.2.1.1 Failure of the PP handover reference retrieval attempt

Upon receipt of a {MM_INFO_REJECT} or upon expiry of P-<MM_info.1>, the PP shall consider the procedure as failed.

The PP shall only attempt an external handover when it has either received "handover reference" or the indication "handover reference not required".

For the contents of {MM_INFO_REJECT} message see clause 9.1.1.2.1.1.

9.1.4 External handover call set-up

The procedure shall be performed as defined in clause 15.7.4 of EN 300 175-5 [5]. The following text together with the associated clauses define the mandatory requirements with regard to the present document.

The PP shall only initiate the external handover call set-up procedure towards FP-2 if the associated call is in active phase; meaning that the CC- transaction to FP-1 is in state T-10: "ACTIVE".

For the initiation of this procedure the outgoing call request procedure shall be used, see clause 8.2 of EN 300 444 [12] with the following modifications/ additions to the {CC-SETUP} message.

Table 13: Values used within the {CC-SETUP} message for external handover call

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<Basic service>>			
	<Call class>	12	External handover call set-up
	<Basic service>	0	
<<Network parameter>>			Optional
	<Discriminator>	All	
	<Data>	All	Allowed length if present 1-10

9.1.4.1 Associated procedures

9.1.4.1.1 Transaction identifier handling

The transaction identifier value for a CC call shall always be assigned the lowest free number as defined in clause 6.9.2 of EN 300 444 [12].

NOTE: When a call has been assigned the transaction identifier value "0", the external handover call set-up will be assigned the transaction identifier value "1" and a subsequent external handover set-up which regards to a subsequent handover will be assigned the transaction identifier value "0".

9.1.4.2 Exceptional cases

9.1.4.2.1 Abnormal link release on FP-1 leg

Upon receipt of an indication from the DLC layer regarding link release of the link to FP-1 before the handover request to FP-2 has been confirmed as defined in EN 300 175-5 [5], clause 15.7.4.2, the PP shall proceed as defined in clause 15.7.4 of EN 300 175-5 [5] without the need of releasing the old connection as defined in clause 15.7.4.5 of EN 300 175-5 [5].

9.1.4.2.2 Normal call release on FP-2 leg

After the handover has been accepted as defined in clause 15.7.4.3 of EN 300 175-5 [5], and the user or the network releases the call normally, normal call release procedure as defined in EN 300 444 [12], clause 8.7 is used with regard to FP-2.

In the case that the old connection to FP-1 has not been released yet, the PP shall also release the old connection using the abnormal call release as defined in EN 300 444 [12], clause 8.8.

9.1.4.2.3 Abnormal link release on FP-2 leg

Upon receipt of an indication from the DLC layer regarding link release of the link to FP-2 before the handover request to FP-2 has been confirmed as defined in EN 300 175-5 [5], clause 15.7.4.2, the PP shall consider the handover procedure as failed and shall remain connected to the FP-1. The PP shall not erase the handover candidate/handover reference for use with FP-1.

In the case that the handover request to FP-2 has already been confirmed when receiving the link release indication, but the PP has not yet released the old link to FP-1, the PP shall also either switch back to the old connection or release the old connection using the abnormal call release as defined in EN 300 444 [12], clause 8.8.

9.1.5 Ciphering procedure

9.1.5.1 Ciphering procedure PT initiated

The procedure shall be performed as defined in the relevant parts of clause 15.7.6 of EN 300 175-5 [5] and clause 8.34 of EN 300 444 [12].

The PP shall only initiate ciphering prior to the release of the old connection in case it supports ciphering on two connections.

9.1.5.2 Ciphering procedure FT initiated

The procedure shall be performed as defined in the relevant parts of clause 15.7.6 of EN 300 175-5 [5] and clause 8.33 of EN 300 444 [12].

9.1.6 U-plane handling

The procedure shall be performed as defined in clause 15.7.5 of EN 300 175-5 [5].

9.2 Emergency call set-up

The following text together with the associated clauses define the mandatory requirements with regard to the present document.

For the initiation of this procedure the outgoing call request procedure shall be used, see clause 8.2 of EN 300 444 [12] with the following replacement to the {CC-SETUP} message.

Table 14: Values used within the {CC-SETUP} message for emergency call

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<Portable identity>>			
	<Type>	16, 0	International Portable Equipment Identity (IPEI), or, in case the PT has access based upon active subscription, may contain the corresponding IPUI
	<EMC>	All	Equipment manufacturer dependent
	<PSN>	All	Equipment manufacturer dependent
<<Fixed Identity>>			
	<Length of contents>	0, 32	Empty, or, in case the PT has access based upon active subscription, may contain the corresponding PARK. The PARK shall be used only in combination with the corresponding IPUI
	<Length of identity value>	All	
	<ARC + ARD>	All	
<<Basic service>>			
	<Call class>	10	Emergency call
PSN Portable equipment Serial Number.			

The FP shall accept the {CC-SETUP} message without checking the <<Fixed Identity>> and <<Portable identity>> IE and proceed with the network layer Outgoing call establishment procedures according to EN 300 444 [12] with the following modification: If the FT-IWU sends MNCC_SETUP_ACK-req primitive (thereby forcing the FT to send a {CC-SETUP-ACK} message to the PT and to enter the "OVERLAP SENDING" state) it shall not wait for the PT to submit dialling information and it shall send as soon as possible (timer F<CC.01> shall not expire) a MNCC_CALL_PROC-reg, MNCC_ALERT-req or MNCC_CONNECT-req primitive thereby forcing the FT to change the CC-state.

The FP shall not authenticate the PP and shall not request ciphering, moreover there shall be no authentication and no ciphering in case access rights are not available. The portable part is not mandated to send dialling information during emergency call.

If the emergency call set-up procedure leads into an abnormal call release according to EN 300 444 [12] clause 8.8 or if the FP rejects the outgoing call request according to clause 8.2.2.3, the handset may search for another FP supporting emergency calls.

9.3 Display

The procedure shall be performed as defined in clauses 10.2 and D.2.2 of EN 300 175-5 [5]. The following text together with the associated clauses define the mandatory requirements with regard to the present document.

An FT may send and a PT shall be able to process a <<Display>> information element even without prior transmission of a <<Multi keypad>> information element.

A <<DISPLAY>> IE may be included in any CC messages in the FT → PT direction except in {CC-NOTIFY} and {IWU-INFO} see EN 300 175-5 [5], clause 6.3.2.

Table 15: Values used within the <<DISPLAY>> IE in any message that include it

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<Multi display>>			
	<Display information>	0CH, 20H, 23H, 2AH, 30H - 7FH	DECT standard characters = standard IA5 characters. For the actual supported values see <<Terminal capability>> I.E.
		02H, 03H, 08H - 0FH, 19H - 7FH	DECT control characters. For the actual supported values see <<Terminal capability>> I.E.

9.4 Terminal capability indication

The following text together with the associated clauses define the mandatory requirements with regard to the present document.

For the initiation of this procedure the GAP Terminal capability indication procedure shall be used, see clause 8.17 of EN 300 444 [12] with the following modifications.

Table 16: Values used within the <<TERMINAL CAPABILITY>> IE

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<Terminal capability>>			
	<Tone capability>	All	
	<Display capability>	5	Full display, indicates support for the full DECT character set.
	<Profile indicator_1>	"xxxxx11"B	CTM Access Profile (CAP) supported
	<Control codes>	All	

9.5 Detach

The procedure shall be performed as defined in clause 13.4.2 of EN 300 175-5 [5]. The following text defines the mandatory requirements with regard to the present document.

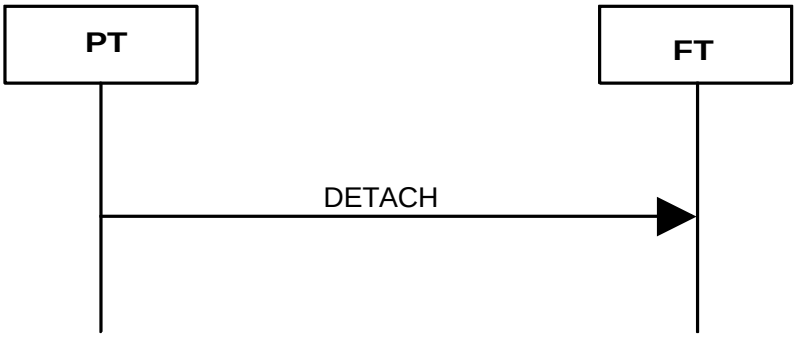

Figure 1: Detach

Table 17: Values used within the {DETACH} message

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<Portable-identity>>			
	<Type>	0	IPUI
	<PUT>	All	
	<PUN>	All	
PUN: Portable User Number PUT: Portable User Type			

9.6 Enhanced location registration

The procedure relates to the feature Periodic location registration (CAP-N.6) and it shall be performed as defined in clause 13.4.1 of EN 300 175-5 [5] and 6.3.1 of EN 300 175-6 [6]. The following text together with the associated clauses define the mandatory requirements with regard to the present document.

To allow periodic location registration, the PT shall evaluate the <<Duration>> IE in {LOCATE-ACCEPT} messages. The PT shall not attempt another location registration before the expiry of the timers defined in <Lock limits> and <Time limits> fields, unless a condition for the initiation of a new location registration (as defined in clause 14.2) may apply.

For the initiation of this procedure the location registration procedure shall be used, see clause 8.28 of EN 300 444 [12] with the following addition to the {LOCATE-ACCEPT} message and subsequent modifications.

Table 18: Values used within {LOCATE-ACCEPT} message for enhanced location registration

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<Duration>>			
	<Lock limits>	111 (binary)	No limits
		101 (binary)	Temporary user limit 2
		110 (binary)	Temporary user limit 1
	<Time limits>	1	Defined time limit 1
		2	Defined time limit 2
		15	Infinite
	<Time duration>	All	

9.6.1 Exceptional case(s)

9.6.1.1 Failure of location registration procedure

Upon expire of <MM_locate.1> or indication for link released is received from the DLC layer, PT shall consider the procedure as failed. The PP shall maintain the existing LAL value. PT shall not re-transmit the {LOCATE-REQUEST} message and shall not restart the timer <MM_locate.1> as part of the same procedure.

To avoid unfinished location registration due to exceptional cases like link failure or bad radio quality the P-IWU shall either repeat an unresponded location registration procedure until it receives a {LOCATE-ACCEPT} or {LOCATE-REJECT} message or attempt location registration in a different location area.

To enable the FT to control the duration until another location registration attempt, the PT shall evaluate the <<Duration>> if received in a {LOCATE-REJECT} message. The PT shall not attempt another location registration before the expiry of the timers defined in <Lock limits> and <Time limits> fields, unless a condition for the initiation of a new location registration (as defined in clause 14.2) may apply.

Table 19: Values used within {LOCATE-REJECT} message for enhanced location registration

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<Duration>>			
	<Lock limits>	111 (binary)	No limits
		101 (binary)	Temporary user limit 1
		110 (binary)	Temporary user limit 2
	<Time limits>	1	Defined time limit 1
		2	Defined time limit 2
		15	Infinite
	<Time duration>	All	

If the PT receives no response to {LOCATE-REQUEST}, it shall wait at least N700 seconds but no longer than N700 + N800 seconds, starting upon expiry of <MM_locate.1>, before re-attempting location registration in the same location area. If the PT is not able to establish or fails to maintain the link during the location registration procedure it shall wait at least N700 seconds but no longer than N700 + N800 seconds, starting upon receipt of DL_RELEASE-ind, before re-attempting location registration in the same location area.

9.7 Message waiting indication

The procedure relates to the feature (CAP-N.4, see clause 5.1) Message Waiting Indication and shall be performed as defined in clause 10.4.2.3 of EN 300 175-5 [5]. Basic services shall be coded as defined in EN 300 196-1 [17].

The following text defines the mandatory requirements with regard to EN 300 175-5 [5], EN 300 196-1 [17] and EN 300 745-1 [15].

Only the MWIIndicate operation definition shall apply to the present document. The procedure defined supports different modes of invocation, as defined in EN 300 745-1 [15].

FT shall use an already established link for the purpose of transmitting the facility containing the message waiting indication to the PT. If link is not available, the FT shall initiate indirect link establishment. Direct FT initiated link establishment is out of the scope of the present document. All MWIIndicate arguments defined in EN 300 745-1 [15] may be used. However, the following minimum requirements apply for the FP and the PP:

- the FP shall send the "basicService" argument to indicate the kind of message, "basicService" elements shall be coded as defined in EN 300 196-1 [17]. The PP shall support a separate MWI status for each of the following basic service values:

  1) voice messages shall be indicated using the "speech (1)" coding;

  2) text messages shall be indicated using the "teletex (33)" coding;

  3) other and unknown messages shall be indicated using the "allServices (0)" coding.

- all other codings are optional to understand for the PP;

- the FP may send the "controllingUserNumber" argument to indicate the party number of the corresponding message server. If the PP supports this, then the PP shall store the number and may use this to call the message server and the minimum PP storing requirement for this number shall be 10 octets (20 digits);

- the PP shall support the "numberOfMessages" argument which may be used to indicate how many messages for the specific Basic Service are waiting. The PP shall be capable to handle values up to 127.

9.7.1 MWIIndicate - activation

To activate the MWI status for a specific basicService, the FP shall send a {FACILITY} message including a <<Facility>> IE as defined in table 20.

NOTE 1: It is the responsibility of the FP to ensure that the MWI status information within the PP is up to date.

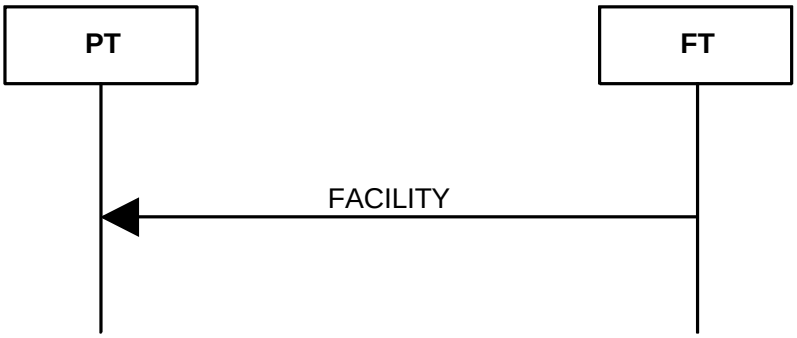

Figure 2: Facility message used for message waiting indication

Table 20: Values used within {FACILITY} message for message waiting indication

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<Facility>>			Codings defined in EN 300 745-1 [15] and EN 300 196-1 [17]
	<Service discriminator>	17	Discriminator for supplementary service applications
	<Component tag>	161	Component Tag = Invoke
	<Invoke Identifier tag>	2	
	<Operation Value >		With regard to OBJECT IDENTIFIER for mWIIndicate
	<controllingUserNumber>	All	It is optional for the FP to include this information, it is optional for the PP to understand this information
	<basicService>	0, 1, 33	Unknown, speech, text messages
	<numberOfMessages>	1..127	It is optional for the FP to include this information

NOTE 2: In order to facilitate the use of the controllingUserNumber for retrieving the waiting message, the FP should ensure it contains the complete party number e.g. including leading 0's.

Regarding the maximum length of the {FACILITY} message the rules as defined in EN 300 444 [12], clause 6.9.3 shall apply.

Upon reception of a {FACILITY} message with a content as defined in table 20, the PP shall activate the MWI status for the specific Basic Service to the receiving user.

9.7.2 MWIIndicate - deactivation

To deactivate the indication of MWI for a specific basic service to the receiving user, the FP shall send a <<Facility>>-Information element with the "numberOfMessages" argument for the specific basic service set to zero, as defined in EN 300 745-1 [15], clause 9.5.1.1.

Table 21: Values used within {FACILITY} message for message waiting indication deactivation

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<Facility>>			Codings defined in EN 300 745-1 [15] and EN 300 196-1 [17]
	<Service discriminator>	17	Discriminator for supplementary service applications
	<Component Tag>	161	Component Tag = Invoke
	<Invoke Identifier tag>	2	
	<Operation Value >		With regard to OBJECT IDENTIFIER for mWIIndicate
	<basicService>	0, 1, 33	Unknown, Speech, Text messages
	<numberOfMessages>	0	

Regarding the maximum length of the {FACILITY} message the rules as defined in EN 300 444 [12], clause 6.9.3 shall apply.

Upon reception of a {FACILITY} message with a content as defined in table 21, the PP shall deactivate the MWI status for the specific Basic Service to the receiving user.

9.7.3 Retrieval of the message

To call the message server, the PP shall use the outgoing call procedures as defined in EN 300 444 [12]. The PP may apply the party number of the message server, if provided, within one or more {CC-INFO} messages.

NOTE: If no number is received, the PP may also apply a locally stored address.

9.8 On-air modification of user parameters

The procedure relates to the feature (CAP-N.7, see clause 5.1) On-air modification of user parameters and shall be performed as defined in clause C.2.3.

The following text together with the associated clauses define the mandatory requirement with regard to the present document.

The procedure consists of two consecutive MM transactions: one access rights modify suggest and other obtaining access rights with its own independent transaction identifier.

Before accepting the on-air modification of user parameters, the PT shall authenticate the FT and if this authentication fails, the PT shall not modify the user parameters.

The following text defines the mandatory requirements with regard to the present document.

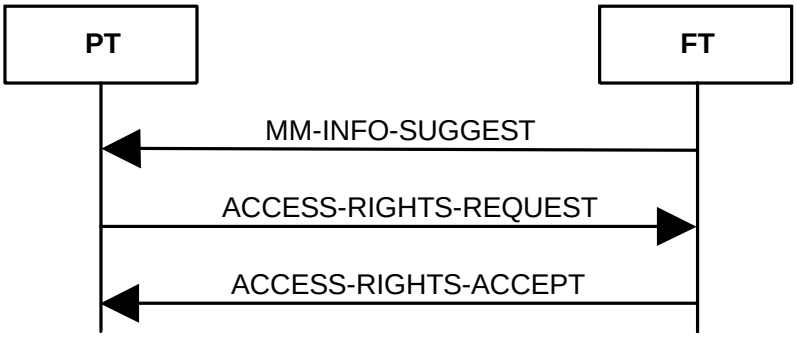

Figure 3: On air modification of user parameters

Table 22: Values used within the {MM-INFO-SUGGEST} message

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<Info-type>>			
	<ext>	1	
	<Parameter type>	1	Access rights modify suggest

The PT shall initiate the obtaining access rights procedure, according to clause 13.5.1, for the on-air-modification of user parameters after the receipt of the {MM-INFO-SUGGEST} message.

The {ACCESS-RIGHTS-REQUEST} message and the {ACCESS-RIGHTS-ACCEPT} message are defined in EN 300 444 [12], clause 8.30. However, inside the {ACCESS-RIGHTS-REQUEST} message the PP shall include subscription data related to the active subscription, for which the modification is requested e.g. the IPUI related to the active subscription shall be included within the <<Portable-identity>>.

The PP shall substitute the stored IPUI, PARK and PLI with the corresponding data which is sent in the {ACCESS-RIGHTS-ACCEPT} message.

9.8.1 Exceptional cases

9.8.1.1 Collision with normal call procedure

The FP shall prohibit incoming calls during the "On-air modification of user parameters" procedure, the PP shall prohibit outgoing normal calls during this procedure.

In case of collision of a normal call attempt and modification of user parameter attempt the PP may ignore the {MM-INFO-SUGGEST} message with regard to EN 300 175-5 [5], clause 17.

10 DLC layer procedures

The complete clause 9 of EN 300 444 [12] forms the description of the DLC layer procedures for the CAP.

11 MAC layer procedures

11.1 General

The complete clause 10.1 of EN 300 444 [12] is part of the description of the MAC layer procedures for the CAP.

11.2 Downlink broadcast

The following text together with the associated clauses define the mandatory requirements with regard to the present document.

For the initiation of this procedure the downlink broadcast service shall be used, see clause 10.2 of EN 300 444 [12] with the following replacement of table 92 of clause 10.2.4 of EN 300 444 [12].

Table 23: Values used within SARI list contents

MAC message	Field within the message	Standard values within the MAC message	Normative action/comment
<<SARI list contents>>			
	<Qh>	5	
	<SARI list length>	All	
	<TARIs yes/no>	All	Relate to service TARI support (CAP-M.1, see clause 5.1).
	<Black yes/no>	All	
	<ARI or black-ARI>	All	

11.3 Non-continuous broadcast

The procedure shall be performed as defined in clauses 9.3, 9.3.1 and 9.3.1.1 of EN 300 175-3 [3].

The following text together with the associated clauses define the mandatory requirements with regard to the present document.

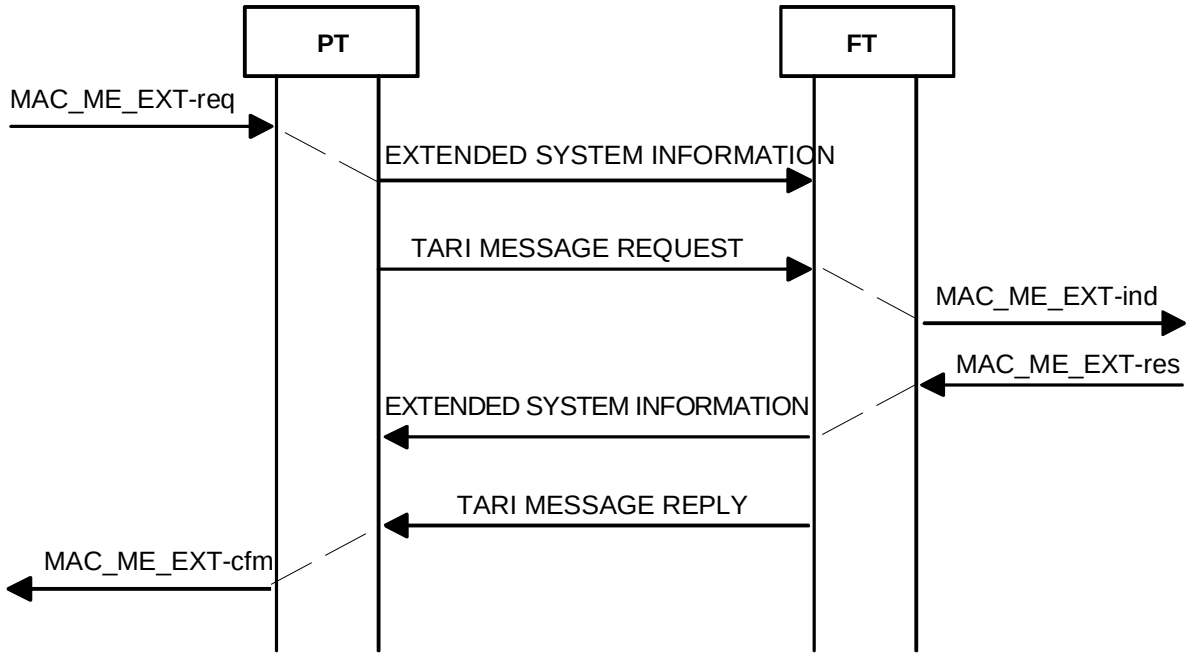

Figure 4: Non-continuous broadcast

11.3.1 Mt message

11.3.1.1 Extended system information

The following fields as defined in clause 7.2.5.6 of EN 300 175-3 [3] shall be supported by the PT and the FT.

Table 24: Values used within extended system information message

MAC message	Field within the message	Standard values within the MAC message	Normative action/comment
<<Mt message>>			
	<Mt header>	4	"Broadcast and C/L services"
	<a b c d>	14	"Extended System Information; A-field procedure"
	<FMID>	All	
	<PMID>	All	

11.3.1.2 TARI message

The following fields as defined in clause 7.2.5.10 of EN 300 175-3 [3] and clause 5.6.6 of EN 300 175-6 [6] shall be supported by the PT and the FT.

Table 25: Values used within TARI message request

MAC message	Field within the message	Standard values within the MAC message	Normative action/comment
<<M_t message>>			
	<M_t header>	8	"TARI message"
	<PLI>	All	
	<PARK>	All	"ARC + ARD"
ARC Access Rights Class ARD Access Rights Details PLI Park Length Indicator PARK Portable Access Rights Key			

Table 26: Values used within TARI message reply

MAC message	Field within the message	Standard values within the MAC message	Normative action/comment
<<M_t message>>			
	<M_t header>	8	"TARI message"
	<CMD>	1	Valid ARI exists in TARI list
		0	No valid ARI exists in TARI list
	<ARCs>	All	For each ARC, except for class A and class E, a separate bit indicates if the TARI list contains entries of this class
	<Identity field>	All	For CMD = 1, the identity field contains the valid ARI

11.4 RFP status

The procedure shall be performed as defined in clause 7.2.4.3.9 of EN 300 175-3 [3].

Table 27: Values used within short page message

MAC message	Field within the message	Standard values within the MAC message	Normative action/comment
<<Short page message>>			
	<Extend flag>	0, 1	See clause 10.3.1 of EN 300 444 [12].
	<BS SDU length indication>	1	See clause 10.3.1 of EN 300 444 [12].
	<20 bits of BS channel data>	All	See clause 10.3.1 of EN 300 444 [12]
	<Information type>	10	RFP status, see clause 11.4.1
	<MAC layer information>	Corresponding information	

Table 28: Values used within zero length page message

MAC message	Field within the message	Standard values within the MAC message	Normative action/comment
<<Zero length page message>>			
	<Extend flag>	0, 1	See clause 10.3.2 of EN 300 444 [12]
	<BS SDU length indication>	0	See clause 10.3.2 of EN 300 444 [12]
	<20 least significant bits of RFPI>	All	See clause 10.3.2 of EN 300 444 [12]
	<Information type>	10	RFP status, see clause 11.4.1
	<MAC layer information>	Corresponding information	

11.4.1 RFP status information

RFPs shall periodically send the "RFP status" (at least every 10 seconds).

RFP and PP shall support the following values of field "RFP status" (bits a36 to a39): "xxx0" (RFP clear for speech), "xxx1" (RFP busy for speech), "xx0x" (system clear) and "xx1x" (system busy).

"RFP busy for speech" means that the RFP recommends the PP to access another RFP.

"System busy" means that the FP recommends the PP to access another FP.

If the PP knows the actual status of an FP by having received "system busy" from the RFP where the PP is locked to, the PP shall not send access_request messages towards this FP. The PP should try to access another FP instead.

If the PP knows the actual status of an RFP by having received "RFP busy for speech" from the RFP where the PP is locked to, the PP shall not send access_request messages towards this RFP. The PP shall try to access another RFP instead.

The PP does not have to wait for the RFP status information before performing a bearer set-up procedure towards an RFP, especially when performing an intercell handover.

To prevent a PP to perform an intercell handover towards an RFP which is "busy for speech", a "busy for speech" RFP should send a "release" message as an immediate answer on reception of an intercell (connection or bearer) handover_request message.

Immediate means in the frame after reception of the intercell handover_request message. Therefore this immediate "release" message indicates the "RFP busy for speech" state of an RFP and a PP can try a next alternative RFP if possible.

11.5 Extended fixed part capabilities

The procedure shall be performed as defined in clauses 7.2.3.5 and 7.2.3.1 of EN 300 175-3 [3].

Table 29: Values used within extended fixed part capabilities message

MAC message	Field within the message	Standard values within the MAC message	Normative action/comment
<<Extended FP capabilities>>			
	<Qh>	4	

For the setting of the extended higher layer information bits see clause 14.8.

11.6 Prolonged preamble

11.6.1 Procedure for prolonged preamble diversity in RFP and prolonged preamble transmission in PP

See EN 300 175-3 [3] clause 7.2.5.5.1.

11.6.2 Procedure for prolonged preamble diversity in PP and prolonged preamble transmission in RFP

The procedure shall be performed as defined in clause 7.2.5.5.1.2 of EN 300 175-3 [3].

At the reception of the quality control prolonged preamble request message, the RFP shall confirm at the next allowed frame by sending the quality control prolonged preamble confirm message.

All RFP transmissions until the quality control prolonged preamble confirm message (included) shall not contain the prolonged preamble.

The PP shall not request the RFP to send prolonged preamble if the RFP broadcasts a standard synchronization field option in the extended fixed part capabilities message (bits a18 to a19, clause 7.2.3.5.2.2 of EN 300 175-3 [3]).

12 Physical layer requirements

12.1 General

The complete clause 11 of EN 300 444 [12] is part of the description of the PHL procedures for the CAP with the following modifications.

12.2 External handover

A PP supporting external handover shall be capable of performing external handover between two RFPs belonging to different FPs which are multiframe synchronized with a reference timer difference up to P100 μsec.

A PP may be capable of supporting external handover between less accurately synchronized or not synchronized RFPs.

12.3 Prolonged Preamble

The measurement for traffic channel selections should include the prolonged preamble when the prolonged preamble is supported by FT and PT. (EN 300 175-3 [3], clause 7.2.3.5.2.2).

13 Requirements regarding the speech transmission

13.1 General

The applicable requirements specified in EN 300 175-8 [8] and TBR 10 [11] shall be applied.

13.2 Reference to GAP

The complete clause 12 of EN 300 444 [12] is part of the description of the requirements regarding the speech transmission for the CAP.

14 Management procedures

14.1 General

The complete clause 13 of EN 300 444 [12] is part of the description of the management procedures for the CAP with the following modifications.

14.2 Location registration initiation

The initiation of the location registration procedure (PT initiated) is dependent on the value of call attribute a_{38} broadcast by the FT, i.e. if set to "1", the PT initiates the location registration procedure in the following cases:

- immediately after a successful access rights procedure;
- upon change of location area; latest immediately after entering the CC null state (T-00);
- upon power-up and after the first lock to a system which the PT has access rights to;
- upon expire of the time limit indicated in the <<DURATION>> IE received during the last successful location registration on the same system or received inside a {LOCATE-REJECT} message as defined in clause 9.6.1.1;
- after losing synchronization (leaving the locked state) for the time defined by the <Lock limits> parameter indicated in the <<DURATION>> IE (see clause 9.6) received during the last successful location registration on the same system;
- upon lock to a system after change of the active IPUI/PARK pair (i.e. change of actual subscription).

If the <<DURATION>> IE cannot be understood, the PT shall ignore the <<DURATION>> IE.

Location registration shall be performed regardless if the system has been accessed via a PARI, SARI or TARI.

If call attribute a_{38} set to "0", the PT does not initiate the location registration procedure except upon receipt of "Locate suggest" in the parameter retrieval procedure initiated by the FT.

The FT may initiate and the PT may receive incoming calls without a location registration procedure. The initiation of the location registration procedure as defined in clause 8.28 of EN 300 444 [12] is always mandatory in the PT except when bit a_{38} in the broadcast attributes, see clause 13.6 table 102 of EN 300 444 [12], is set to 0.

14.3 Assigned individual Temporary Portable User Identity (TPUI) management

Only one individual assigned TPUI shall be stored per subscription i.e. any new assignments of an individual assigned TPUI overwrites an existing individual assigned TPUI.

The PT shall always delete the old individual assigned TPUI immediately when entering a new location area prior the initiation of location registration procedure. The PT shall always delete the old individual assigned TPUI immediately when entering a new location area even if the location registration is not being performed i.e. the broadcast attribute a_{38} is set to value "0", see clause 13.6 table 102 of EN 300 444 [12].

Upon detach TPUI shall be deleted in PT.

The default TPUI shall be derived from the allocated International Portable User Identity (IPUI). If no IPUI has been allocated, the TPUI shall be derived from IPUI N i.e. the IPEI.

The LCE-PAGE-REJECT message shall not be used to delete an assigned TPUI.

NOTE: To avoid ambiguities of assigned TPUIs/Portable part MAC Identities (PMIDs), assigned TPUIs should be unique within the entire FP rather then within location areas. See also note 2 in clause 6.3.1 of EN 300 175-6 [6].

14.4 Detach

Detach shall be performed immediately upon power-down of PT if the PT is still in range of the active subscription.

Detach shall be performed to an active subscription before change of subscription if the PT is still in the range of the previously active subscription.

If, in this case, location registration is supported on the new subscription, detach shall be performed to the active subscription prior to location registration to the new subscription.

The PT is not required to send the {DETACH} message to residential FTs.

In case of detach, MM may indicate that the normal link release procedures shall be used.

14.5 External handover

The PT shall not initiate location registration during external handover.

The PT shall not perform an external handover within N500 seconds after the last successfully performed external handover.

After N501 consecutive unsuccessful attempts, the PP shall wait N500 seconds before initiating a new external handover attempt.

Regarding handover retrieval, the minimum PP storage requirement is 3 handover candidates.

14.6 Emergency call management

Emergency call is initiated by a special manual interworking at the MMI of a DECT PP. This may be the dialling of "112", pressing of a special "emergency call button", or selecting a menu-item.

After recognition of this manual interworking the PP may decide whether:

a) to initiate the emergency call procedure; or

b) to initiate a normal outgoing call (according to EN 300 444 [12]) and dial automatically a (preconfigured) emergency call number.

Case b) is allowed only, when the PP is locked to a DECT FP where it has access-rights to.

NOTE 1: In Case a) if the PP is not synchronized to a FP which supports emergency calls, the PP should start to search for an FP which supports emergency calls. The PP recognizes this by reading the extended higher layer capabilities of the FP. Because it is most likely that a public DECT FP supports emergency calls, the PP should try first to synchronize to a public FP. The PP identifies a system being "public" using the identity ARC which is broadcast more often than the "emergency call supported" message by the RFPs. If there is no public FP supporting emergency calls available, the handset should try to search also for private FPs supporting emergency calls.

If a PP is not in range of a FP where it has access-rights to, the PP is allowed to lock to every FP in range which supports emergency calls even when no emergency call is initiated. This will shorten the time for setting up emergency calls and makes it possible to indicate the availability of the emergency call to the user. If the PP is locked to a FP, to which it does not have access-rights to, the PP shall not initiate any other procedure than emergency call set-up towards this FP.

NOTE 2: When locked to an FP providing emergency call access only, the PP should not completely stop searching for FP's matching one of the active subscriptions.

14.7 PMID management

If the PP has a valid assigned individual TPUI, the PMID shall be this TPUI.

If the PP has not a valid assigned individual TPUI, the PMID shall be the arbitrary PMID. It may be derived from the IPUI used for the MAC connection set-up.

If a link has to be established for an external handover into a new location area, the arbitrary PMID shall be used for this link establishment.

A PP attempting an emergency call shall use the emergency call TPUI as defined in EN 300 175-6 [6] clause 6.3.1 as PMID value.

Within a link establishment procedure, the assigned PMID is recalculated for every connection set-up attempt (during the connection set-up procedure the assigned PMID shall not change); the arbitrary PMID is recalculated for every new bearer set-up attempt.

The PT shall not update its PMID until the current DLC link is released even if a connection or bearer handover has taken place or the individual assigned TPUI has changed, e.g. due to change of the LA.

14.8 Broadcast attributes management

RFPs belonging to the same location area shall broadcast the same values of higher layer attributes at any given time (see annex F in EN 300 175-5 [5]).

The CAP PP shall be capable to read and interpret at least the following broadcast attributes codings during locking procedure. In the locked state the PP may assume them as static.

Table 30: Broadcast attributes interpretation by the PP

BIT Number	Attribute	Value	Note
a45	External handover supported	All	Relates to feature (CAP-N.1, see clause 5.1).

Table 31: Extended higher layer capabilities interpretation by the PP

BIT Number	Attribute	Value	Note
a40	Emergency call supported	All	Relate to feature (CAP-N.2, see clause 5.1).

14.9 Message waiting indication

The PT shall store the information which is received inside the <<FACILITY>> information element in volatile memory.

The PT shall delete this information upon power-down and upon change of subscription, i.e. changing of the active IPUI/PARK pair.

The use of partial release is not required for CLSS.

15 Application procedures

15.1 General

The complete clause 14 of EN 300 444 [12] is part of the description of the application procedures for the CAP with the following modifications.

15.2 Subscription control

The PP shall be capable of accepting a new subscription for the active IPUI and PARK pair, in order to change the access rights (i.e. overwriting the active subscription).

The active IPUI/PARK pair is the stored IPUI/PARK value that the PT is using to seek to get locked or is locked to.

The CAP PT shall be capable of storing at least four subscriptions i.e. 4 pairs of IPUI and PARK and associated subscription data.

Annex A (normative): System parameters

A.1 NWK layer constants

N500: external handover re-attempt value.

Mandated value is 8.

N501: unsuccessful external handover attempts within a defined time.

Mandated value is 5.

N700: location re-attempt time 1.

Mandated value is 20.

N800: location re-attempt time 2.

Mandated value is 60.

A.2 PHL constants

P100: maximum reference timer difference of multiframe synchronized RFPs belonging to different FPs among which external handover is supported.

Mandated value is 5.

Annex B (informative): PP locking procedure for on air subscription

This procedure is given in annex A of EN 300 444 [12].

Annex C (informative): Void

Annex D (informative): Tones, progress indicator and U-plane connection

See annex B of EN 300 444 [12].

Annex E (informative): PARI and SARI use for CTM roaming

A CTM user subscribes to the CTM service offered by a CTM service provider. The CTM service provider provides the CTM service using the equipment of one or more network operators. These network operators can be of different nature: public, business and/or residential. The area of mobility provided to the CTM-user depends on the geographical area covered by the totality of equipment of the network operators with whom his service provider has a relationship.

The CTM service provider is identified by one single and globally unique CTM service provider identity, the SP-id.

The network operator equipment is identified by a range of network operator equipment identities, the NO-id's. More than one NO-id can be assigned to the same network operator.

As part of the agreement between CTM service provider and network operators, all involved network operators will administer the SP-id.

Radio base stations of all involved network operators will broadcast the SP-id of the CTM service provider in addition to their own local network equipment's NO-id.

CTM users have a contract with the CTM service provider and as part of the contract they are given the SP-id by means of which they can recognize those parts of the network that take part in the provision of the CTM service for that particular CTM service provider. This SP-id is stored in the user's cordless terminal.

While roaming around, the CTM terminal uses the SP-id to determine whether it has access to local radio base stations (by comparing the broadcast SP-id with its own stored SP-id). If it has access, then the NO-id of the local base station is used as an indication of the location within the network.

NO-ids are structured in such a way that a terminal, while moving within the domain of a SP-id, can determine whether handover or location registration is required (by comparison of the current NO-id with the newly detected NO-id of a neighbouring piece of network operator equipment).

Both the SP-id and the NO-id are mapped to the single DECT concept of "Access Rights Identities" (ARI). However it is important the realize that the application is principally different.

The NO-id is kept in the DECT Fixed Part as the Primary Access Rights Identity (PARI) and is broadcast as part of the Radio Fixed Part Identity (RFPI). Separate PARI values are assigned to each DECT Fixed Part.

The SP-id is kept in the DECT Fixed Part as a Secondary Access Rights Identity (SARI) and is broadcast (but less frequently) by all radio base stations in addition to their RFPI.

In the CTM terminal the SP-id is kept as the user's Portable Access Rights Key (PARK) in association with the user's IPUI.

Figure E.1 gives an illustration.

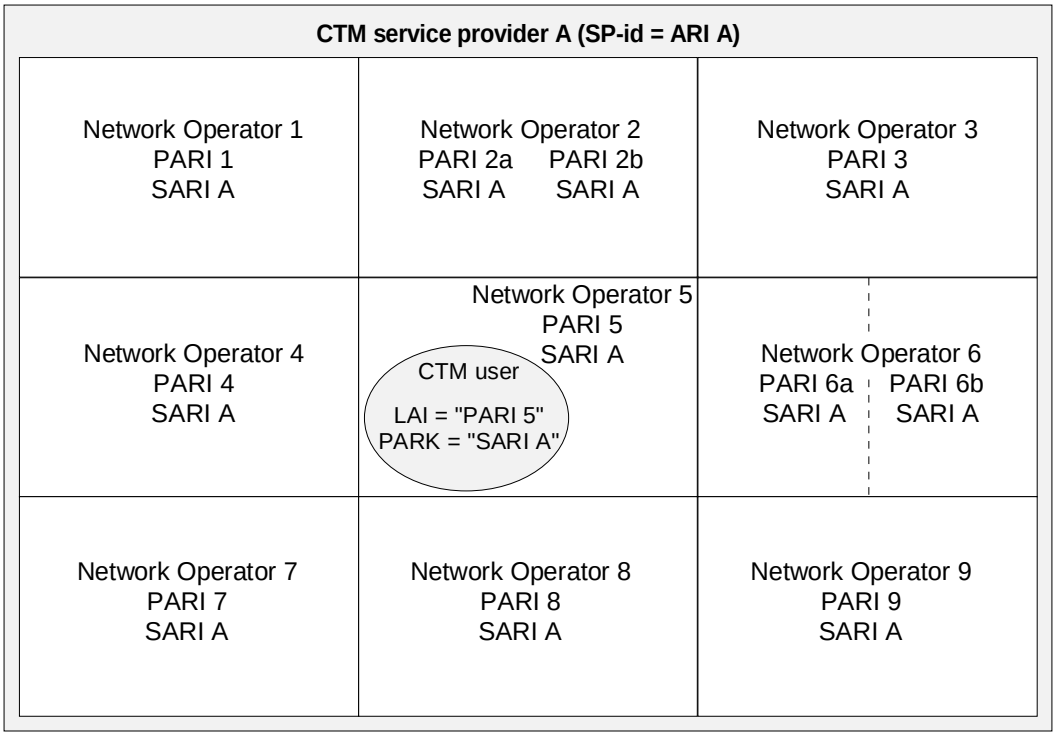

Figure E.1

By comparison of its PARK with the ARI(s) in the SARI-lists of broadcasting radio base stations, the CTM terminal decides whether it has access to that part of the network, and if required starts a location registration. If that is successful, the terminal uses the PARI-value of the current part of the network as a Location Area Identification (LAI). While roaming around, the terminal recognizes other valid network parts by the broadcast SARI. The currently stored LAI, in combination with received PARI-values of local network elements is used by the terminal to decide for handover and/or location registration.

In summary:

- there is a logical and functional difference between the ARI assigned to a network operator and the ARI assigned to a service provider;
- the ARI broadcast as PARI (in RFPI) identifies the network operator and is used to provide the criteria for handover and location registration;
- the ARI broadcast as SARI identifies the service provider and is used by the terminal to determine whether the broadcasting network operator is associated with the CTM service provider, i.e. whether that network operator can give him/her access to subscribed-to CTM service;
- the NO-id's ARI-class (public, business, residential) is independent of the SP-id's ARI-class;
- the SARI glues together all of the network operator equipment into a single domain of a CTM service provider;
- the CTM terminal only needs one subscription. IPUI and PARK are allocated by the service provider and the PARK relates to the ARI of the service provider.

NOTE: If a certain network operator uses its equipment exclusively for CTM and only for one CTM service provider, then the functions of SP-id and NO-id may combined into the PARI and no SARI would be needed.

Annex F (normative): Class 2 synchronization requirements

A Class 2 synchronization for a CAP FP shall fulfil the requirements as specified in EN 300 175-2 [2], annex C with the following modifications.

The rear falling edge of a transmitted synchronization pulse shall occur at the output port of the master FP 15 µs ± Tt µs before T0 of **any** RFP on the master FP.

Tt = 2 µs.

T0 of **any** RFP on a slave FP shall occur Td µs after the rear falling edge of the synchronization pulse at the input of a slave FP.

Td = 15 µs ± 2 µs.

Annex G (normative): Synchronization requirements for fixed parts

Public systems shall provide intersystem synchronization and shall have either GPS synchronization and a Class 1 or Class 2 synchronization output port or a complete Class 1 or Class 2 synchronization port (input and output). This will allow absolute time synchronization via GPS or wired mutual synchronization if an operator requires local synchronization between fixed parts.

Annex H (informative): Coding example for message waiting indication

Although the coding of the component types is defined by application of the basic encoding rules to the abstract syntax, this annex gives an example of the coding for illustrative purposes.

Example-components for MWIIndicate

EXAMPLE 1: Includes basicService, numberOfMessages, controllingUserNr and controllingUserProvidedNr.

A1,33,	Invoke component
02,01, 37,	invoke ID (here 37H)
06,06, 04,00,85,69,01,03,	object identifier mWIIndicate
30,26,	SEQUENCE + Length
A1,0B, 80,09,34,39,32,39,34,34,32,30,30,	controllingUserNr (here e.g. unknown PartyNumber 4 92 94 42 00)
A2,03, 0A,01,01,	basic service (here speech)
A3,03, 02,01,64,	message counter (here 100)
A4,0D,	controllingUserProvidedNumber
A1,0B,	(here e.g. PublicPartyNumber)
0A,01,01,	type of PublicPartyNumber (here international)
12,06,31,32,33,34,35,36;	number (123456)

EXAMPLE 2: Includes basicService, numberOfMessages, time and message Id.

A1,2D,	Invoke component
02,01, 37,	invoke ID (here 37H)
06,06, 04,00,85,69,01,03,	object identifier mWIIndicate
30,20,	SEQUENCE + Length
A2,03, 0A,01,00,	basic service (here allServices)
A3,03, 02,01,03,	message counter (here 03)
A5,0A, 18,08,31,39,39,37,30,35,32,37,	GeneralizedTime (e.g. 1997 05 27)
A6,08,	message Id
30,06,	
02,01,14,	messageRef
0A,01,00;	messageStatus (added message)

Annex I (informative): Bibliography

ETS 300 650: "Integrated Services Digital Network (ISDN); Message Waiting Indication (MWI) supplementary service; Service description".

History

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