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**Digital Enhanced Cordless Telecommunications (DECT);
Low Rate Messaging Service (LRMS)
including Short Message Service (SMS)**



Reference

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Foreword

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

National transposition dates	
Date of adoption of this EN:	19 January 2001
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Introduction

The present document replaces the former ETS 300 757, known as the E.2 profile, and the former ETS 301 678, known as CTM FP2. It defines profiles for Digital Enhanced Cordless Telecommunications (DECT) systems conforming to EN 300 175 parts 1 [1] to 8 [8]. It is part of a family of profiles aimed at the general connection of terminals supporting non-voice services to a fixed infrastructure, private and public.

1 Scope

The Low Rate Messaging Service (LRMS), specified in the present document, provides a means for the slow, acknowledged or unacknowledged, transfer of multimedia message objects, including the Short Message Service (SMS). It provides both point-to-point and point-to-multipoint messaging. This service may be used for private and public roaming applications.

The present document defines the requirements on the Physical (PHY), Medium Access Control (MAC), Data Link Control (DLC) and Network (NWK) layers of DECT. The standard also specifies management entity requirements and generic interworking conventions, which ensure the efficient use of the DECT spectrum.

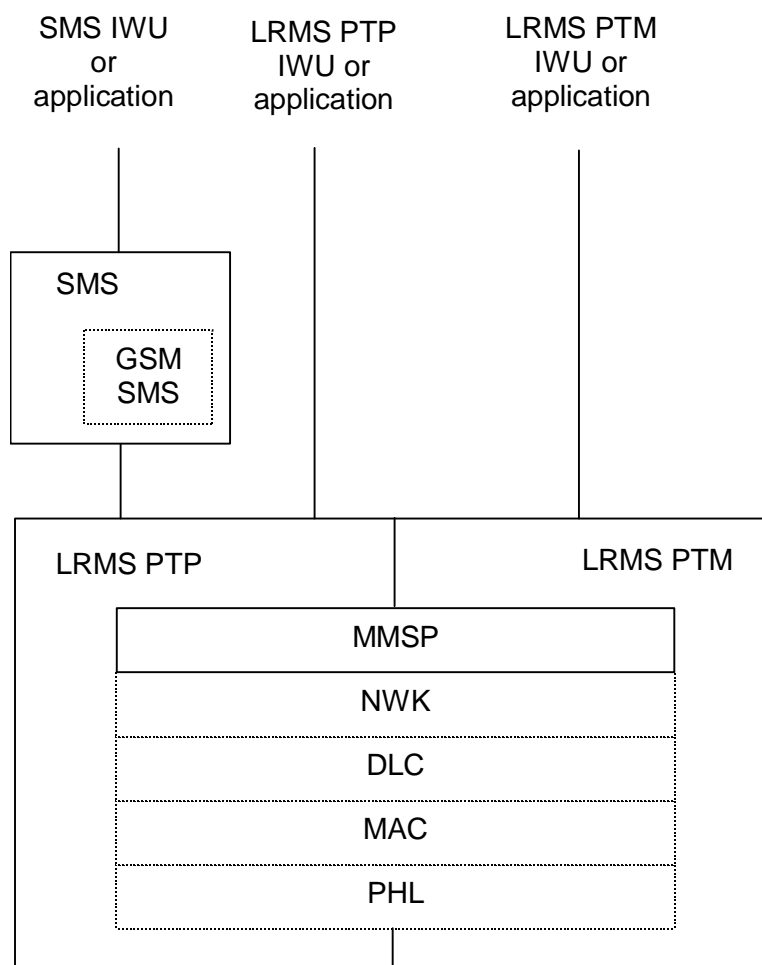
The present document further mandates how to implement a GSM like Short Message Service (SMS), Point to Point (PTP), which uses a sub-set of the Low Rate Messaging Service (LRMS) mentioned before as a bearer service. SMS-PTP includes the following two services:

- SMS Mobile Originated (SMS-MO), for transport of short messages from PT to FT;
- SMS Mobile Terminated (SMS-MT), for transport of short messages from FT to PT.

The Short Message Service, Cell Broadcast is outside the scope of the present document.

In order to facilitate re-use of existing GSM Service Centres, the present document applies the upper GSM protocols up-to and including the GSM SMS-RP protocol. Therefore, interworking functions handling the encapsulation of GSM SMS-RP messages are specified.

The following picture shows the protocols defined in the present document.



The SMS or LRMS applications are outside the scope of the present document. So is the network behind the FP. Any information provided concerning applications or the network behind the FP is provided for informative, descriptive reasons only.

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] 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 EN 300 444: "Digital Enhanced Cordless Telecommunications (DECT); Generic Access Profile (GAP)".
- [10] ETSI ETS 300 559: "European digital cellular telecommunications system (Phase 2); Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface (GSM 04.11)".

3 Definitions, symbols and abbreviations

3.1 Definitions

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

multiframe: repeating sequence of 16 successive Time Division Multiple Access (TDMA) frames, that allows low rate or sporadic information to be multiplexed (e.g. basic system information or paging)

service class 1: local area applications, for which terminals are pre-registered off-air with one or more specific fixed parts, and establishment of service and user parameters is therefore implicit, according to a profile-defined list

service class 2: private and public roaming applications for which terminals may move between fixed parts within a given domain and for which association of service parameters is explicit at the time of service request

SMS-SC: SMS Short Message Center. It is the logical entity able to store and forward short messages

TDMA frame: time-division multiplex of 10 ms duration, containing 24 successive full slots. A TDMA frame starts with the first bit period of full slot 0 and ends with the last bit period of full slot 23

3.2 Symbols

The symbols defined in this clause are applied for procedures, features, 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 non-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.

3.3 Abbreviations

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

ACK	Acknowledgement
ADPCM	Adaptive Pulse Code Modulation
CC	Call Control
C _F	higher layer signalling Channel (Fast)
CLMS	Connectionless Message Service
C-plane	Control Plane
CTM	Cordless Terminal Mobility
C _S	higher layer signalling Channel (Slow)
DAM	DECT Authentication Module
DECT	Digital Enhanced Cordless Telecommunications
DLC	Data Link Control
FP	Fixed Part
FT	Fixed radio Termination
FTP	File Transfer Protocol
GAP	Generic Access Profile
GSM	Global System for Mobile communication
HTTP	Hyper Text Transfer Protocol

IE	Information Element
I _p	higher layer Information channel (Protected)
IWF	Interworking Functions
IWU	Interworking Unit
LAP	Link Access Procedure
LAP-C	Link Access Procedure (Control)
LCE	Link Control Entity
LLN	Logical Link Number (DLC layer)
LRMS	Low Rate Messaging Service
M	MAC control channel
MAC	Medium Access Control
MCE	Message Control Entity
MMSP	Multimedia Messaging Service Protocol
MNCC	Mobile Network Call Control
MO	Mobile Originated
MT	Mobile Terminated
NLF	New Link Flag
NWK	Network
P	Paging channel
PDU	Protocol Data Unit
PHL	Physical Layer
PHY	Physical
PP	Portable Part
PT	Portable radio Termination
PTM	Point-To-Multipoint
PTP	Point-To-Point
Q	system information channel
RFP	Radio Fixed Part
RFPI	Radio Fixed Part Identifier
SAP	Service Access Point
SAPI	Service Access Point Identifier
SC	Service Center
SDU	Service Data Unit
SIM	Subscriber Identity Module
SM	Short Message
SM-RP	Short Message Relay Layer Protocol
SM-TP	Short Message Transfer Layer Protocol
SMS	Short Message Service
SMS-MO	SMS Mobile Originated
SMS-MT	SMS Mobile Terminated
TDMA	Time Division Multiple Access
UI	Unnumbered Information (Frame)
U-plane	User plane
WWW	World Wide Web

4 Description of services

4.1 General

The DECT data profile defined in the present document has been intended for message transfer or paging and is optimized for small SDUs, low PP complexity and ultra-low power consumption. Two service types are defined: Low Rate Messaging Service Point-To-Point (LRMS PTP) which may be unacknowledged or acknowledged used for point-to-point messaging and Low Rate Messaging Service Point-To-Multipoint (LRMS PTM) used for point-to-multipoint messaging. The LRMS PTM is an optional feature while LRMS PTP support is mandatory if this profile is supported.

The LRMS PTP and PTM may co-exist with other profiles and their existence should not have any effect on the functionality of the other existing profiles. That is, the LRMS functionality should have a secondary priority in respect to the profile relations.

The present document also mandates how LRMS PTP is to be used for transfer of GSM like SMS messages.

4.2 Low Rate Messaging Service (LRMS)

4.2.1 Point-To-Point (PTP)

The objectives of the LRMS PTP profile are as follows:

The LRMS PTP is a generic set of commands, information elements and functionality for file/messaging service. In most of the cases LRMS can be regarded as a DECT internal teleservice that can interwork with the similar services in external networks. In addition LRMS PTP provides means to convey transparently application specific upper layer protocol frames thus facilitating the usage of this profile as a bearer service. It provides a generic file handling/messaging services over the DECT air interface by utilizing the transportation mechanism of the DECT C-plane in the best way possible while offering a general set of functions to the applications using its services. The LRMS procedures can be accessed in a standardized way through a set of primitives. The LRMS point-to-point service may be acknowledge or unacknowledged.

LRMS provides a compact subset of functions to messaging servers with the advantage that a single terminal with LRMS support can use a wide variety of messaging services with minimum amount of application layer complexity. If a complete set of services is needed an escape sequence has to be used or some other means such as transparent protocol transportation mechanism should be used.

The Multimedia Messaging Service Protocol (MMSP) fulfils these objectives.

MMSP that is used for the provision of LRMS services and functionality is a stateless protocol which defines a set of messages, framing rules and information elements each containing optional and mandatory information fields.

MMSP utilizes the services of the DECT Call Control (CC) entity. It could be regarded as a supplementary service type of service that provides signalling/control and application specific information related to the teleservices provided by the DECT data profiles.

The MMSP layer functionality is provided by a set of specific DECT network layer CC information elements. Therefore the MMSP is not from DECT layer viewpoint a separate real protocol layer but a service provided to the application. However, from the application perspective the MMSP can be seen as a protocol layer. Therefore, the MMSP can be regarded as a virtual protocol layer.

The support of MMSP protocol in LRMS PTP is mandatory.

In general the LRMS PTP may receive or send messages during an on-going other profile based call but this requires a separate CC instance.

4.2.2 Point-To-Multipoint (PTM)

The objectives of LRMS PTM profile are as follows:

The purpose of this service is to provide a point-to-multipoint broadcast service of alphanumeric messages from Fixed Part (FP) to PPs. The messages are not acknowledged. With the addressing provided a subset of the receiving PP can be pre-selected or the messages can be aimed at all PPs in the range of a specific Radio Fixed Part (RFP). Thus the DECT FP service provider can select the receiving terminals and area.

NOTE: For the addressing of the PPs the connectionless TPUI is used.

The LRMS PTM service provides means for sending a subset of MMSP messages over a point-to-multipoint link. This facilitates the usage of standard format messages in both point-to-point and point-to-multipoint cases. With this functionality a network server can control a subgroup of MMSP terminals with single multicast messages without a need of full bi-directional link instantiation. In this way the LRMS PTM facilitates a simple and cost effective means of messaging and remote group control of terminal equipment saving at the same time the air interface resources.

The LRMS PTM may co-exist with other profiles in the PPs and FPs. The co-existence of the LRMS PTM should not have any affect on the functionality of the co-existing profiles.

The support of LRMS PTM is optional and if supported the MMSP support is mandatory.

In general the LRMS PTM may function during an on going other profile based call but this requires a separate CC instance.

4.3 Short Message Service (SMS)

The objectives of SMS are as follows:

The Short Message Service (SMS) provides a means of transferring GSM like SMS messages over the Low Rate Messaging Service Point-To-Point (LRMS PTP).

SMS applies the protocols (procedures, messages) defined in the DECT common interface specification EN 300 175 parts 1 [1] to 8 [8], the DECT Generic Access Profile (GAP) [9], and the GSM SMS Standard [10].

4.4 Service objectives

The profile has the service objectives given in table 4.1 and table 4.2:

Table 4.1

Offered services	SMS / LRMS PTP	LRMS PTM
Point-to-point SDU transfer PP-FP	Yes	Not supported
Point-to-point SDU transfer FP-PP		
Point-to-multipoint SDU transfer FP-PP	Not Supported	Yes
Encryption	Optional	Not supported
MMSP support	Mandatory	Mandatory
Support in the present document	Mandatory	Optional

Table 4.2

Performance	SMS / LRMS PTP	LRMS PTM
Maximum throughput for non-segmented messages with minimum header (NOTE 1)	1,38 kbit/s C _S channel	1,23 kbit/s CL _S channel
Error rate	< 10 ⁻⁹ per bit	< 10 ⁻⁹ per bit
Minimum SDU size (NOTE 2)	48 octets	43 octets
SDU size if segmentation used (NOTE 3)	≤ 5 632 octets	≤ 4 992 octets
NOTE 1: The throughput depends strongly on the used control channel and on the other services that are in use simultaneously and these figures are the maximum reachable rates for the user data if no other profiles are in use.		
NOTE 2: This length is the maximum length of the application layer SDU (user information) if only mandatory elements are used at their minimum length and no network layer segmentation is used.		
NOTE 3: The maximum supported size is defined in the interworking annexes on a per service basis.		

5 Low Rate Messaging Service (LRMS)

5.1 Reference configuration

The reference configuration for this profile shall be as shown in figure 5.1.

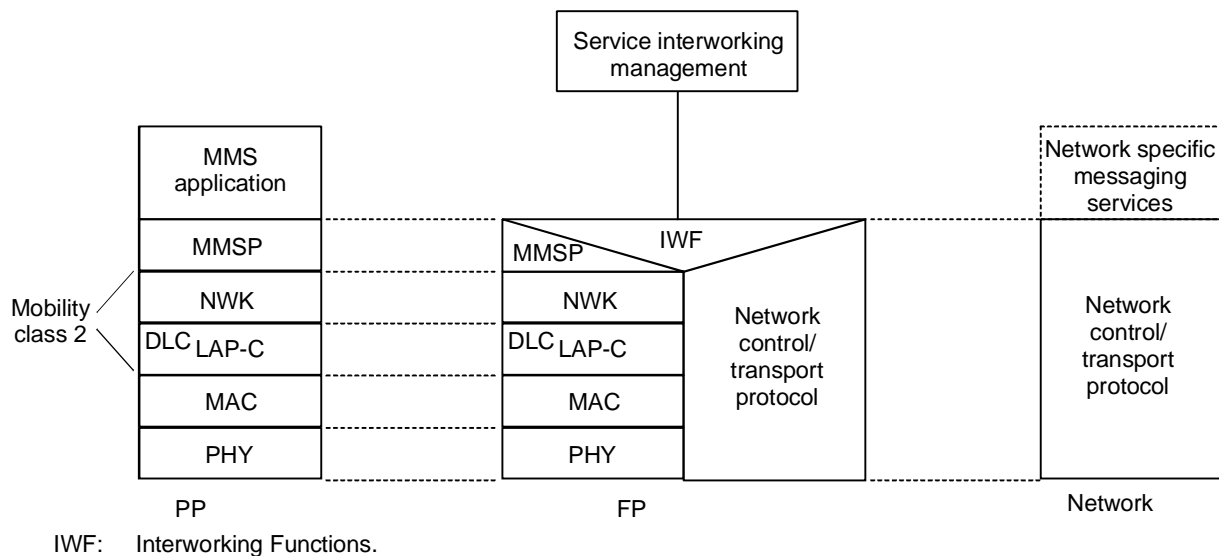


Figure 5.1: Profile reference configuration of LRMS showing signalling and message interworking to connectionless networks via the C-plane

5.2 Functional description

5.2.1 General

The functional description as outlined in subclause 6.2 of the present document shall apply.

5.2.2 Exceptions for Point-To-Multipoint (PTM) service

5.2.2.1 MMS relations to outside networks (horizontal model)

The model defined in the subclause 6.2.2 of the present document shall apply with the following rules:

- the messaging direction is always from MCE to portable MMS entity. Due to this no IWU conversion can be requested in FP IWU or MCE IWU with MMSP messages;
- the MCE as well as the fixed MMS entity may do implicit IWU conversions but this conversion cannot be controlled with MMSP;
- only such MMS procedures are available that are allowed in the direction of fixed MMS entity to portable MMS entity. The portable MMS entity cannot control the MCE messaging;
- the end entity may send message only to the MMS entities;
- the addressing of a group of portable entities shall be done in the fixed entity by mapping the incoming address to the Point-To-Multipoint (PTM) as specified in each interworking descriptions.

The PTM MMS messaging horizontal functional model has been illustrated in figure 5.2

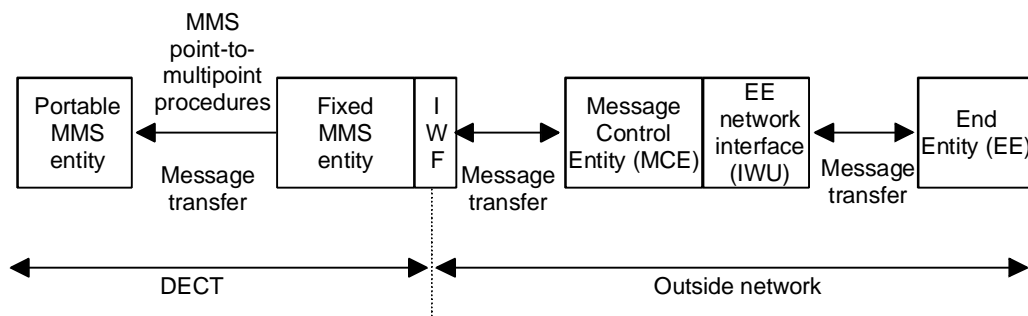


Figure 5.2: The MMS horizontal functional model for point-to-multipoint service

5.2.2.2 Architecture

The internal architecture of the MMSP layer as defined in subclause 6.2.3 of the present document shall apply with the exception that the C-MMS part is not required in the LRMS PTM service. That is, the M-MMS part interacts directly with the DECT upper layer as illustrated in figure 5.1 No connection establishment phase is required on MMSP layer.

5.2.2.3 MMS relations to the upper/lower layers (vertical model)

The model defined in the subclause 6.2.4 shall apply.

5.2.2.4 Phases of the horizontal interactions

Only the phase 3 b) of the horizontal interaction of PP terminated incoming MMS call as defined in subclause 6.2.5.2.3 of the present document shall apply.

5.3 Physical layer requirements

The physical layer requirements of EN 300 444 [9] shall apply.

5.4 MAC layer requirements

5.4.1 Requirements Point-To-Point (PTP) service

The minimum instance shall only require the capability to establish and maintain single-bearer connections. The provisions of EN 300 175-3 [3] shall be implemented with respect to the services, procedures, messages and information elements coding listed in subclause 5.4.3 of the present document. The provisions of EN 300 175-6 [6] shall be implemented with respect to the structure and use of identities.

The C_F may be used if the co-existing profile provides the channel and the LRMS PTP usage does not noticeably disturb the main profile transmissions. If no other profiles exist then the C_S channel shall be used.

The MAC extended fixed part information message shall be used and, therefore, bit a12 of the fixed part information field shall be set to 1. In addition, the extended higher layer capabilities bit a43 for the support of the LRMS profile shall be set to 1.

5.4.2 Requirements Point-To-Multipoint (PTM) service

The minimum instance shall only require the capability to establish and maintain single-bearer connections. The provisions of EN 300 175-3 [3] shall be implemented with respect to the services, procedures, messages and information elements coding listed in subclause 5.4.3 of the present document. The provisions of EN 300 175-6 [6] shall be implemented with respect to the structure and use of identities. The Fixed radio Termination (FT) and Portable radio Termination (PT) shall support the downlink connectionless procedure as defined in EN 300 175-3 [3].

FT and PT shall support either the CL_S or CL_F channel. The CL_F may be used if the co-existing profile provides the channel and the LRMS PTM usage does not noticeably disturb the main profile transmissions. If no other profiles exist then the CL_S channel shall be used.

The broadcast attributes coding for CLMS, bit a42 shall be set to 1.

5.4.3 Capabilities

5.4.3.1 Services

Table 5.1: Service support

Service supported			
Item No.	Name of service	EN 300 175-3 [3] reference	Status
1	Type 1f I _N _minimum delay	5.6.2.1	I
2	Type 2f I _N _normal delay	5.6.2.1	I
3	Type 3f I _P _error_detection	5.6.2.1	I
4	Type 4f I _P _error_correction	5.6.2.1	I
5	Type 5 I _N _normal delay	5.6.2.2	I
6	Type 6 I _P _error_detection	5.6.2.2	I
7	Type 7f I _P _error_correction	5.6.2.2	I
8	Type 1h I _N _minimum delay	5.6.2.1	I
9	Type 2h I _N _normal delay	5.6.2.1	I
10	Type 3h I _P _error_detection	5.6.2.1	I
11	Type 4h I _P _error_correction	5.6.2.1	I
12	C _S duplex	5.3.1.1	C101
13	C _F duplex	5.3.1.1	C102
14	Downlink CL _S only	5.7.2.1	C103
15	Downlink CL _F + CL _S	5.7.2.1	C104
16	Downlink CL _S + SIN	5.7.2.1	I
17	Uplink CL _F only	5.7.2.2	I
18	Uplink CL _S only	5.7.2.2	I
19	Uplink without SDU	5.7.2.2	I
20	GF simplex	5.3.1.3	I
21	Fast paging	11.3.3.1	O
22	Normal paging	11.3.3.1	M
23	Low duty cycle paging	11.3.3.1	O
24	System identities	11.3.2	M
25	System information	11.3.2	M
26	Encryption	6.2.3	C105
27	Fast setup	11.3.3.2	I

C101: IF LRMS PTP (point to point) service supported THEN M ELSE I

C102: IF protected B-field available THEN M ELSE I

C103: IF LRMS PTM (point-to-multipoint) service supported THEN M ELSE I

C104: IF LRMS PTM (point-to-multipoint) service supported AND protected B-field available THEN M ELSE I

C105: IF encryption supported THEN M

5.4.3.2 Protocol parameters

Table 5.2: Protocol parameters

Protocol parameters supported				
Item No.	Name	EN 300 175-3 [3] reference	Status	Value
1	N200	10.2	C201	10
2	N201	10.6	I	
3	N202	11.4	M	10
4	N203	9.2	I	

C201: IF LRMS PTP (point to point) service supported THEN M ELSE I

5.4.3.3 Messages

Table 5.3: Messages in A_tail

Supported messages						
Item No.	Name	EN 300 175-3 [3] reference	Status			
			PT Sending	PT Receiving	FT Sending	FT Receiving
1	TA code: CT data packet number 0	7.1.2	M	M	M	M
2	TA code: CT data packet number 1	7.1.2	M	M	M	M
3	TA code: identities information on connectionless bearer	7.1.2	N/A	C305	M	N/A
4	TA code: identities information	7.1.2	M	M	M	M
5	TA code: multiframe sync. and system information	7.1.2	N/A	M	M	N/A
6	TA code: main escape	7.1.2	X	X	X	X
7	TA code: MAC layer control	7.1.2	M	M	M	M
8	TA code: paging/first PT transmission	7.1.2	M	M	M	M
9	BA code: U-type, IN, SIN or I _P packet number 0	7.1.4	M	M	I	I
10	BA code: U-type, I _P error detect or I _P packet number 1	7.1.4	I	I	I	I
11	BA code: E-type, all C _F or CL _F , packet number 0	7.1.4	C301	C301	C301	C301
12	BA code: E-type, all C _F , packet number 1	7.1.4	C301	C301	C301	C301
13	BA code: E-type, not all C _F or CL _F ; C _F packet number 0	7.1.4	C301	C301	C301	C301
14	BA code: E-type, not all C _F ; C _F packet number 1	7.1.4	C301	C301	C301	C301
15	BA code: E-type, all MAC control	7.1.4	I	I	I	I
16	BA code: no B_field	7.1.4	N/A	O	O	N/A
17	NT information	7.2.2	M	M	M	M
18	Static system information	7.2.3.2	N/A	M	M	N/A
19	Extended RF carrier information	7.2.3.3	N/A	I	I	N/A
20	Fixed part capabilities	7.2.3.4	N/A	M	M	N/A
21	Extended fixed part capabilities	7.2.3.5	N/A	M	M	N/A
22	SARI message	7.2.3.6	N/A	O	O	N/A
23	Multi-frame number	7.2.3.7	N/A	C303	C303	N/A
24	Q-channel escape	7.2.3.8	N/A	I	I	N/A
25	Zero length page indication	7.2.4.2.3	N/A	M	M	N/A
26	Short page indication	7.2.4.2.3	N/A	M	M	N/A
27	Full page indication	7.2.4.2.3	N/A	O	I	N/A
28	Not the last 36 bits of a long page indication	7.2.4.2.3	N/A	I	I	N/A
29	The first 36 bits of a long page indication	7.2.4.2.3	N/A	I	I	N/A
30	The last 36 bits of a long page indication	7.2.4.2.3	N/A	I	I	N/A
31	All of a long page indication	7.2.4.2.3	N/A	I	I	N/A
32	PT header extend flag	7.2.4.2.2	N/A	M	M	N/A
33	PT MAC information: fill	7.2.4.3.2	N/A	O	O	N/A
34	PT MAC information: blind full slot	7.2.4.3.3	N/A	C306	C306	N/A
35	PT MAC information: other bearer	7.2.4.3.4	N/A	O	O	N/A
36	PT MAC information: recommended other bearer	7.2.4.3.4	N/A	O	O	N/A
37	PT MAC information: good RFP bearer	7.2.4.3.4	N/A	O	O	N/A
38	PT MAC information: dummy or C/L bearer position	7.2.4.3.4	N/A	M	M	N/A
39	PT MAC information: RFP identity	7.2.4.3.5	N/A	I	I	N/A
40	PT MAC information: dummy or C/L bearer marker	7.2.4.3.7	N/A	O	O	N/A
41	PT MAC information: escape	7.2.4.3.6	N/A	I	I	N/A
42	PT MAC information: bearer handover type 0000	7.2.4.3.8	N/A	I	I	N/A

Supported messages						
Item No.	Name	EN 300 175-3 [3] reference	Status			
			PT Sending	PT Receiving	FT Sending	FT Receiving
43	PT MAC information: bearer handover type 0001	7.2.4.3.8	N/A	I	I	N/A
44	PT MAC information: bearer handover type 0010	7.2.4.3.8	N/A	I	I	N/A
45	PT MAC information: bearer handover type 0011	7.2.4.3.8	N/A	I	I	N/A
46	Basic access request	7.2.5.2	C302	N/A	N/A	C302
47	Basic bearer handover request	7.2.5.2	I	N/A	N/A	I
48	Basic connection handover request	7.2.5.2	I	N/A	N/A	I
49	Basic unconfirmed access request	7.2.5.2	I	N/A	N/A	I
50	Basic bearer confirm	7.2.5.2	N/A	C302	C302	N/A
51	Basic wait	7.2.5.2.3	C302	C302	C302	I
52	Basic bearer release	7.2.5.2	C302	C302	C302	I
53	Advanced access request	7.2.5.3.2	I	I	I	I
54	Advanced bearer handover request	7.2.5.3.3	I	I	I	I
55	Advanced connection handover request	7.2.5.3.4	I	I	I	I
56	Advanced bearer confirm	7.2.5.3.6	I	I	I	I
57	Advanced unconfirmed access request	7.2.5.3.5	I	I	I	I
58	Advanced wait	7.2.5.3.7	I	I	I	I
59	Advanced attributes-T request	7.2.5.3.8	I	I	I	I
60	Advanced attributes-T confirm	7.2.5.3.8	I	I	I	I
61	Advanced bandwidth-T request	7.2.5.3.9	I	I	I	I
62	Advanced bandwidth-T confirm	7.2.5.3.9	I	I	I	I
63	Advanced channel list	7.2.5.3.10	I	I	I	I
64	Advanced unconfirmed dummy	7.2.5.3.11	I	I	I	I
65	Advanced unconfirmed handover	7.2.5.3.12	I	I	I	I
66	Advanced bearer release	7.2.5.3.13	I	I	I	I
67	Transmit on the specified slot/frequency test message	7.2.5.4.2	N/A	I	N/A	I
68	Loopback B_field test message	7.2.5.4.3	N/A	I	N/A	I
69	Defeat antenna diversity test message	7.2.5.4.4	N/A	I	N/A	I
70	Force bearer handover test message	7.2.5.4.5	N/A	I	N/A	I
71	Clear test mode test message	7.2.5.4.6	N/A	I	N/A	I
72	Single bearer antenna switch QC message	7.2.5.5	O	O	O	O
73	All bearer antenna switch QC message	7.2.5.5	O	O	O	O
74	Bearer handover QC message	7.2.5.5	I	I	I	I
75	Connection handover QC message	7.2.5.5	I	I	I	I
76	Single bearer frequency control QC message	7.2.5.5	O	O	O	O
77	All bearer frequency control QC message	7.2.5.5	O	O	O	O
78	C/L single transmission with 1 CL _F segment	7.2.5.6	C304	C304	C304	C304
79	C/L single transmission with 2 CL _F segments	7.2.5.6	C304	C304	C304	C304
80	C/L single transmission with 3 CL _F segments	7.2.5.6	C304	C304	C304	C304
81	C/L single transmission with 4 CL _F segments	7.2.5.6	C304	C304	C304	C304
82	1st C/L half slot transmission with 1 CL _F segment	7.2.5.6	I	I	I	I
83	1st C/L full slot transmission with 4 CL _F segment	7.2.5.6	C304	C304	C304	C304
84	2nd C/L transmission with 1 CL _F segment	7.2.5.6	C304	C304	C304	C304
85	2nd C/L transmission with 2 CL _F segment	7.2.5.6	C304	C304	C304	C304
86	2nd C/L transmission with 3 CL _F segment	7.2.5.6	C304	C304	C304	C304
87	2nd C/L transmission with 4 CL _F segment	7.2.5.6	C304	C304	C304	C304
88	C/L single transmission without CL _F segment	7.2.5.6	C301	C301	C301	C301
89	1st C/L transmission without CL _F segment (CL _S service)	7.2.5.6	C301	C301	C301	C301

Supported messages						
Item No.	Name	EN 300 175-3 [3] reference	Status			
			PT Sending	PT Receiving	FT Sending	FT Receiving
90	Change dummy position	7.2.5.6	O	N/A	N/A	O
91	Extended system information	7.2.5.6	O	N/A	N/A	O
92	Start encryption: request	7.2.5.7	C303	N/A	N/A	C303
93	Start encryption: confirm	7.2.5.7	N/A	C303	C303	N/A
94	Start encryption: grant	7.2.5.7	C303	N/A	N/A	C303
95	Stop encryption: request	7.2.5.7	C307	N/A	N/A	C307
96	Stop encryption: confirm	7.2.5.7	N/A	C303	C303	N/A
97	Stop encryption: grant	7.2.5.7	C303	N/A	N/A	C303
98	First transmission for B_field setup	7.2.5.8	I	I	I	I
99	M-channel escape	7.2.5.9	I	I	I	I

C301: IF protected B-field available THEN M ELSE I

C302: IF encryption supported THEN M ELSE O

C303: IF LRMS PTP (point to point) service supported THEN M ELSE I

C304: IF LRMS PTM (point-to-multipoint) service supported AND protected B-field available THEN M ELSE I

C305: IF LRMS PTM (point-to-multipoint) service supported THEN O ELSE I

C306: IF RFP has blind slots THEN M else O

C307: IF supported by higher layers then M ELSE O

5.4.3.4 Message parameters

Table 5.4: Parameters of static system information message

Supported parameters				
Item No.	Parameter	EN 300 175-3 [3] reference	Status	Values
1	Normal-reverse	7.2.3.2.2	M	0
2	Slot number	7.2.3.2.3	M	0 - 11
3	Start position	7.2.3.2.4	M	0
4	Escape	7.2.3.2.5	M	0 - 1
5	Number of transceivers	7.2.3.2.6	M	0 - 3
6	Extended RF carrier flag	7.2.3.2.7	M	0 - 1
7	RF carriers available	7.2.3.2.8	M	0 - 1 023
8	Spare	7.2.3.2.11	M	0
9	Carrier number	7.2.3.2.10	M	0 - N
10	Spare	7.2.3.2.11	M	0
11	Primary receiver scan number	7.2.3.2.12	M	0 - N

Table 5.5: Parameters of fixed part capabilities message

Fixed part capabilities						
Item No.	Parameter	EN 300 175-3 [3] reference	Status		Values	
			PT	FT	PT	FT
1	Extended FP information	7.2.3.4.2	M	M	0, 1	0, 1
2	Full slot	7.2.3.4.2	M	M	1	0, 1
3	Frequency control	7.2.3.4.2	M	M	0, 1	0, 1
4	Page repetition	7.2.3.4.2	M	M	0, 1	0, 1
5	C/O setup on dummy allowed	7.2.3.4.2	M	M	0,1	C501
6	C/L uplink	7.2.3.4.2	M	M	0, 1	0, 1
7	C/L downlink	7.2.3.4.2	M	M	C501	C502
8	Basic A_field setup	7.2.3.4.2	M	M	C502	C503
9	Advanced A_field setup	7.2.3.4.2	M	M	0, 1	0, 1
10	B_field setup	7.2.3.4.2	M	M	0, 1	0, 1
11	C _F messages	7.2.3.4.2	C503	M	C504	C504

Fixed part capabilities						
Item No.	Parameter	EN 300 175-3 [3] reference	Status		Values	
			PT	FT	PT	FT
12	I _N _minimum_delay	7.2.3.4.2	M	M	0, 1	0, 1
13	I _N _normal_delay	7.2.3.4.2	M	M	0, 1	0, 1
14	I _P _error_detection	7.2.3.4.2	M	M	0, 1	0, 1
15	I _P _error_correction	7.2.3.4.2	M	M	0, 1	0, 1
16	Multibearer connection	7.2.3.4.2	M	M	0, 1	0, 1

C501: IF LRMS PTM (point-to-multipoint) service supported THEN 0 ELSE 0, 1

C502: IF LRMS PTM (point-to-multipoint) service supported THEN 1 ELSE 0, 1

C503: IF LRMS PTP (point to point) service supported THEN 1 ELSE 0,1

C504: IF protected B-field available THEN 1 else 0,1

5.4.3.5 Functions implemented

Table 5.6: Function implemented

Supported functions					
Item No.	Function name	EN 300 175-2 [2] reference	EN 300 175-3 [3] reference	Status	
				PT	FT
1	B_field data scrambling		6.2.4	C601	C601
2	B_field data unscrambling		6.2.4	C601	C601
3	R-CRC generation		6.2.5.2	M	M
4	R-CRC checking		6.2.5.2	M	M
5	X-CRC generation		6.2.5.4	C601	C601
6	X-CRC checking		6.2.5.4	C602	C602
7	Z-CRC generation	4.8		I	I
8	Z-CRC checking	4.8		I	I
9	D-MAP D80 field mapping		6.2.1.1	I	I
10	D-MAP D32 field mapping		6.2.1.1	M	C601
11	D-MAP D08 field mapping		6.2.1.1	I	I
12	D-MAP D00 field mapping		6.2.1.1	O	M
13	A-MAP A_field mapping		6.2.1.2	M	M
14	E/U-MUX E80 type multiplex		6.2.2.2	I	I
15	E/U-MUX E32 type multiplex		6.2.2.2	C601	C601
16	E/U-MUX E08 type multiplex		6.2.2.2	I	I
17	E/U-MUX U80a type multiplex		6.2.2.2	I	I
18	E/U-MUX U80b type multiplex		6.2.2.2	I	I
19	E/U-MUX U32a type multiplex		6.2.2.2	C603	C603
20	E/U-MUX U32b type multiplex		6.2.2.2	C602	C602
21	E/U-MUX U08a type multiplex		6.2.2.2	I	I
22	E/U-MUX U08b type multiplex		6.2.2.2	I	I
23	C-MUX B_field full slot mode 0 multiplex		6.2.2.3.1	C601	C601
24	C-MUX B_field full slot mode 1 multiplex		6.2.2.3.1	C601	C601
25	C-MUX B_field full slot mode 2 multiplex		6.2.2.3.1	C601	C601
26	C-MUX B_field full slot mode 3 multiplex		6.2.2.3.1	C601	C601
27	C-MUX B_field full slot mode 4 multiplex		6.2.2.3.1	C601	C601
28	C-MUX B_field half slot mode 0 multiplex		6.2.2.3.2	I	I
29	C-MUX B_field half slot mode 1 multiplex		6.2.2.3.2	I	I
30	T-MUX Tail multiplex		6.2.2.1.2	M	M
31	Frequency correction function		11.5.2.2	O	O

C601: IF protected B-field available THEN M ELSE I

C602: IF protected B-field available THEN O ELSE I

C603: IF LRMS PTP (point to point) service supported THEN M ELSE I

5.4.3.6 Timer support

Table 5.7: Timer support

Timer support					
Item No.	Name	EN 300 175-3 [3] reference	Status		Values
			PT	FT	PT and FT
1	T200	10.2	C701	C701	3 seconds
2	T201	11.5	C701	C701	5 seconds
3	T202	10.6	I	I	3 seconds
4	T203	10.6	N/A	I	16 frames
5	T204	9.1	I	M	6 multiframe
6	T205	9.1	M	M	10 seconds
7	T206	11.2	I	I	10 frames
8	T207	11.3	M	N/A	5 seconds
9	T208	11.3	M	N/A	20 seconds
10	T209	11.4	M	M	30 seconds
11	T210	11.4	C701	M	2 seconds
12	T211	10.3	I	I	3 seconds
13	T212	10.5	I	I	20 frames
14	T213	10.7	I	I	20 frames
15	T214	9.2	I	I	20 frames
16	T215	9.2	I	I	6 multiframe

C701: IF LRMS PTP (point to point) service supported THEN M ELSE I

5.4.3.7 Procedure support

Table 5.8: Procedure support

Procedure support				
Item No.	Name of procedure	EN 300 175-3 [3] reference	Status	
			PT	FT
1	Downlink connectionless procedure	9.1.2	C801	C801
2	Downlink broadcast procedure	9.1.1	M	M
3	Uplink connectionless procedure	9.2.3	I	I
4	Request for specific Q information procedure	9.3.1	O	O
5	Request for a new dummy procedure	9.3.2	O	O
6	Basic setup procedure for single bearer basic connection of known service	10.2.4.2	C802	C802
7	Normal setup procedure for single bearer advanced connection of known service	10.2.4.2	I	I
8	Fast setup procedure for single bearer advanced connection of known service	10.2.4.2	I	I
9	Normal setup procedure multi-bearer symmetric connection	10.2.4.3.1	I	I
10	Fast setup procedure for multi-bearer symmetric connection	10.2.4.3.1	I	I
11	Normal setup procedure for full asymmetric downlink connection	10.2.4.3.3	I	I
12	Fast setup procedure for full asymmetric downlink connection	10.2.4.3.3	I	I
13	Normal setup procedure for full asymmetric uplink connection	10.2.4.3.2	I	I
14	Fast setup procedure for full asymmetric uplink connection	10.2.4.3.2	I	I
15	Setup procedure for connection with unknown service	10.2.4.3	I	I
16	Connection modification procedure	10.3	I	I
17	Connection release procedure	10.4	I	I
18	Basic single bearer setup procedure	10.5.1.1	C802	C802
19	A_field advanced single bearer setup procedure	10.5.1.2	I	I
20	B_field single bearer normal setup procedure	10.5.1.3.1	C803	C803
21	B_field single bearer fast setup procedure	10.5.1.3.2	I	I
22	Double simplex bearer indirect setup procedure	10.5.1.4	I	I
23	Double simplex bearer direct setup procedure	10.5.1.4	I	I
24	Duplex bearer handover procedure	10.6.2	I	I

Procedure support				
Item No.	Name of procedure	EN 300 175-3 [3] reference	Status	
			PT	FT
25	Double simplex bearer handover procedure	10.6.3	I	I
26	Unacknowledged bearer release procedure	10.7.2.1	C802	C802
27	Acknowledged bearer release procedure	10.7.2.2	I	I
28	Fast bearer release procedure	10.7.2.3	I	I
29	Q1 and Q2 bits setting procedure for C-channel data	10.8.1	C804	C804
30	Q1 and Q2 bits setting procedure for I _N and I _{P_error_detection} data	10.8.1.3	I	I
31	BCK and Q2 bits setting for I _{P_error_correction} data in symmetric connection	10.8.2.4.1	I	I
32	BCK and Acknowledgement (ACK) bit setting for I _{P_error_correction} data in asymmetric connection	10.8.2.4.1	I	I
33	Bearer replacement procedure	10.8.2.5.1	I	I
34	Mac message jump procedure	10.8.2.5.2	I	I
35	Unilateral jump procedure	10.8.2.5.3	I	I
36	Idle_locked state entering procedure	11.3.2	N/A	N/A
37	Idle_locked state maintaining procedure	11.3.3	N/A	N/A
38	Duplex bearer channel selection procedure	11.4.1	I	I
39	Double simplex bearer channel selection procedure	11.4.1	I	I
40	Simplex bearer channel selection procedure	11.4.1	I	I
41	Uplink connectionless channel selection	9.2.2	I	I
42	Radio Fixed Part Identifier (RFPI) handshaking procedure	11.5.1	M	M
43	PT frequency correction procedure	11.5.2.2	O	O
44	MAC layer test message procedure	12.2	I	I
45	Receiver scanning procedure	11.9	M	M
46	PP paging procedure	9.1.3.2	M	M
47	Channel list procedure	10.5.2	I	I

C801: IF LRMS PTM (point-to-multipoint) service supported THEN M ELSE I

C802: IF LRMS PTP (point to point) service supported THEN M ELSE I

C803: IF LRMS PTP (point to point) service supported THEN O ELSE I

C804: IF protected B-field available THEN M ELSE I

Table 5.9: Parameters of channel selection procedure (duplex/double/simplex bearer)

Supported parameters				
Item No.	Parameter	EN 300 175-3 [3] reference	Status	Values
1	Lowest boundary of channel list	11.4.1	M	< = - 93 dBm
2	Band resolution	11.4.1	M	6 dB
3	RSSI variation between checking	11.4.1	M	< = 12 dB

5.5 DLC layer requirements

5.5.1 Requirements C-plane Point-To-Point (PTP) service

All internal DECT protocol control, all external user data and control shall be handled by the C-plane. The provisions of EN 300 175-4 [4] shall be implemented with respect to the services, procedures, messages and information elements coding listed in annexes E and F. The minimum supported DLC layer frame length shall be 63 octets.

NOTE: The requirement of the DLC layer C plane is as far as possible compatible with GAP (EN 300 444 [9]).

5.5.2 Requirements C-plane Point-To-Multipoint (PTM) service

All internal DECT protocol control shall be handled by the C-plane. All external user data and control shall be handled by the C-plane. The provisions of EN 300 175-4 [4] shall be implemented with respect to the services, procedures, messages and information elements coding listed in annexes E to F of this document with the condition of LRMS PTM.

The DLC layer Link Access Procedure (Control) (LAP-C) class U operation shall be supported. The Unnumbered Information (UI) frames shall be fragmented to use either the CL_S or CL_F channel. The minimum supported DLC layer frame length shall be 63 octets.

5.5.3 Requirements U-plane

The U-plane shall not be used by the present document. However the presence of LRMS should not noticeably limit the functionality of the possible other coexisting profiles using the U-plane.

5.5.4 Capabilities

5.5.4.1 C-plane services

Table 5.10: C-plane data link services

Supported services			
Item No	C-plane services	EN 300 175-4 [4] reference	Status
1	Class U service	5.1	C1001
2	Class A service	5.1	C1002
3	Class B service	5.1	C1003

C1001: IF LRMS_PTP (point to point) service supported THEN M ELSE I

C1002: IF LRMS_PTP (point to point) service supported THEN O ELSE I

C1003: IF LRMS_PTM (point-to-multipoint) service supported THEN M ELSE I

Table 5.11: C-plane broadcast service

Supported services			
Item No	C-plane services	EN 300 175-4 [4] reference	Status
1	Broadcast service	5.2, 9.4	M

5.5.4.2 C-plane procedures

5.5.4.2.1 Point to point acknowledged operation

Table 5.12: Class A procedures

Supported procedures			
Item No	Operation - General procedures	EN 300 175-4 [4] reference	Status
1	Class A link establishment	9.2.3.1	C1201
2	Class A acknowledged information transfer	9.2.3.2	C1201
3	Class A link release	9.2.3.7	C1201
4	Class A link re-establishment	9.2.3.8	C1201
5	Class A connection handover	9.2.7.3.1	C1202

C1201: IF class A service supported THEN M ELSE I

C1202: IF class A service supported THEN O ELSE I

Table 5.13: Class A features

Supported features			
Item No	Operation - General feature	EN 300 175-4 [4] reference	Status
1	Segmentation of NWK information	5.1.1, 7.7	C1301
2	C _S channel fragmentation and recombination	6.1.2, 6.1.3, 6.1.4, 6.1.4.2	C1301
3	C _F channel fragmentation and recombination	6.1.2, 6.1.3, 6.1.4, 6.1.4.1	C1302

C1301: IF class A service supported THEN M ELSE I

C1302: IF class A service supported THEN O ELSE I

Table 5.14: Class A parameter values

Supported parameter values			
Item No	Parameter	EN 300 175-4 [4] reference	Status
1	Fixed window size of 1?	9.2.3.2, 7.5.2.2	C1401
2	Modulo 2?	9.2.3.2, 7.5.2.1	C1401

C1401: IF class A service supported THEN M ELSE I

Table 5.15: Class B procedures

Supported procedures			
Item No	Operation - General procedures	EN 300 175-4 [4] reference	Status
1	Class B multiple frame establishment	9.2.4	C1501
2	Class B information transfer	9.2.5	C1501
3	Class B link release	9.2.6	C1501
4	Class B link suspension and resumption	9.2.7	C1501
5	Class B connection handover	9.2.7.3.2	C1502

C1501: IF class B service supported THEN M ELSE I

C1502: IF class B service supported THEN O ELSE I

Table 5.15a: Class B features

Supported features			
Item No	Operation - General feature	EN 300 175-4 [4] reference	Status
1	Segmentation of NWK information	5.1.1, 7.7	C1501
2	C _S channel fragmentation and recombination	6.1.2, 6.1.3, 6.1.4, 6.1.4.2	C1501
3	C _F channel fragmentation and recombination	6.1.2, 6.1.3, 6.1.4, 6.1.4.1	C1502

C1501: IF class B service supported THEN M ELSE I

C1502: IF class B service supported THEN O ELSE I

Table 5.16: Class B parameter values

Supported parameter values			
Item No	Parameter	EN 300 175-4 [4] reference	Status
1	Fixed window size of 3?	9.2.4.2, 7.5.2.2	C1601
2	Modulo 1 in ULI state?	9.2.4.2	C1601
3	Modulo 8 in ASM state?	9.2.4.2, 7.5.2.1	C1601

C1601: IF class B service supported THEN M ELSE I

5.5.4.2.2 Unacknowledged operation

Table 5.17: Class U procedures

Supported procedures			
Item No	Operation - General procedures	EN 300 175-4 [4] reference	Status
1	Class U link establishment	9.3.2	C1701
2	Class U information transfer	9.3.3	C1701
3	Class U link release	9.3.4	C1701

C1701: IF 5.1.1 THEN M ELSE I

5.5.4.2.3 Broadcast operation

Table 5.18: Broadcast procedures

Supported procedures			
Item No	Operation - General procedures	EN 300 175-4 [4] reference	Status
1	Normal operation	9.4.1	M
2	Expedited operation	9.4.2	O

5.5.4.2.4 Management procedures

Table 5.19: Management procedures

Supported procedures			
Item No	General procedures	EN 300 175-4 [4] reference	Status
1	MAC connection management	10.2	M
2	DLC C-plane management	10.3	M
3	DLC U-plane management	10.4	I
4	Connection handover management	10.5	C1901
5	Connection ciphering management	10.6	C1902

C1901: IF LRMS_PTP (point to point) service supported THEN O ELSE I

C1902: IF connection handover management supported THEN M ELSE I

Table 5.20: MAC connection management procedures

Supported procedures			
Item No	Procedures	EN 300 175-4 [4] reference	Status
1	MAC connection set-up	10.2.1	M
2	MAC connection release	10.2.2	M
3	MAC connection modification	10.2.3	I
4	MAC connection identification	10.2.4	M
5	Selection of logical channels (C_S or C_F)	10.2.5	M

Table 5.21: DLC C-plane management procedures

Supported procedures			
Item No	Procedures	EN 300 175-4 [4] reference	Status
1	Provision of link signature	10.3.1	M
2	Routeing of connection oriented links	10.3.2	C2101
3	Routeing of connectionless links	10.3.3	C2102

C2101: IF LRMS_PTP (point to point) service supported THEN M ELSE I

C2102: IF LRMS_PTM (point-to-multipoint) service supported THEN M ELSE I

Table 5.22: Connection ciphering management procedures

Supported procedures			
Item No	Procedures	EN 300 175-4 [4] reference	Status
1	Providing a key to the MAC layer	10.6.1	C2201
2	Starting and stopping the ciphering	10.6.2	C2201
3	Connection handover	10.6.3	C2201

C2201: IF connection handover management supported THEN M ELSE I

5.5.4.3 C-plane PDU frame structure

Table 5.23: Frame structures

Supported frames structures						
Item No	Frame Structures	EN 300 175-4 [4] reference	Status			
			PT Sending	PT Receiving	FT Sending	FT Receiving
1	Frame structure of format type FA.	6.1	M	M	M	M
2	Broadcast service frame structure	6.2	N/A	M	M	N/A

Table 5.24: Frame format type FA

Frame format type FA			
Item No	Frame elements	EN 300 175-4 [4] reference	Status
1	Address field	6.1	M
2	Control field	6.1	M
3	Length indicator field	6.1	C2401
4	Information field	6.1	C2401
5	Fill field	6.1	C2401
6	Checksum field	6.1	M

C2401: IF address field supported in I-command (table 5.27 item 1) THEN M ELSE I

Table 5.25: Broadcast service frame structure

Supported frames structures						
Item No	Frame elements	EN 300 175-4 [4] reference	Status			
			PT Sending	PT Receiving	FT Sending	FT Receiving
1	Short frame format (3 octets)	6.2.1	N/A	M	M	N/A
2	Long frame format (5 octets)	6.2.1	N/A	O	M	N/A

5.5.4.4 C-plane messages

Table 5.26: Message support

Supported messages			
Item No	Message elements	EN 300 175-4 [4] reference	Status
1	I-command	7.11	M
2	RR-command/response	7.11	M
3	RNR-command/response	7.11	C2601
4	REJ-command/response	7.11	C2601
5	SABM-command	7.11	C2601
6	DM-response	7.11	C2601
7	UI-command	7.11	M
8	DISC-command	7.11	C2601
9	UA-response	7.11	C2601

C2601: IF class B service supported THEN M ELSE I

Table 5.27: I-command (numbered information)

I-command (numbered information)				
Item No.	Name of information element and field element	EN 300 175-4 [4] reference	Status	Value
1	Address field	7.2	M	
1.1	RES	7.3.1	M	1
1.2	C/R	7.3.2	M	0
1.3	SAPI	7.3.3	M	0
1.4	Logical Link Number (LLN)	7.3.5	M	1 (C2701) 2 - 6 (C2702)
1.5	New Link Flag (NLF)	7.3.4, 9.2.2.1	M	0 - 1
2	Control field	7.4	M	
2.1	N(S)	7.5.2.4	M	0 - 1 (C2701) 0 - 7 (C2702)
2.2	P	7.5.1, 9.2.1	M	0 (C2701) 0 - 1 (C2702)
2.3	N(R)	7.5.2.6	M	0 - 1 (C2701) 0 - 7 (C2702)
3	Length indicator field	7.6	M	
4	Information field	7.8	M	
5	Checksum field	7.10	M	

C2701: IF class A service supported

C2702: IF class B service supported

Table 5.28: RR-command/response (Receive Ready)

RR-command/response (Receive Ready)				
Item No.	Name of information element and field element	EN 300 175-4 [4] reference	Status	Value
1	Address field	7.2	M	
1.1	RES	7.3.1	M	1
1.2	C/R	7.3.2	M	0 - 1
1.3	SAPI	7.3.3	M	0
1.4	LLN	7.3.5	M	1 (C2801) 2 - 7 (C2802)
1.5	NLF	7.3.4, 9.2.2.1	M	0-1
2	Control field	7.4	M	
2.1	S (Supervisory function bits)	7.5.2.4	M	0
2.2	P/F	7.5.1, 9.2.1	M	0 (C2801) 0 - 1 (C2802)
2.3	N(R)	7.5.2.6	M	0 - 1 (C2801) 0 - 7 (C2802)
3	Checksum field	7.10	M	

C2801: IF class A service supported

C2802: IF class B service supported

Table 5.29: RNR-command/response (Receive Not Ready)

RNR-command/response (Receive Not Ready)				
Item No.	Name of information element and field element	EN 300 175-4 [4] reference	Status	Value
1	Address field	7.2	M	
1.1	RES	7.3.1	M	1
1.2	C/R	7.3.2	M	0 - 1
1.3	SAPI	7.3.3	M	0
1.4	LLN	7.3.5	M	2 - 6
1.5	NLF	7.3.4, 9.2.2.1	M	0 - 1
2	Control field	7.4	M	
2.1	S (Supervisory function bits)	7.5.2.4	M	1
2.2	P/F	7.5.1, 9.2.1	M	0 - 1
2.3	N(R)	7.5.2.6	M	0 - 7
3	Checksum field	7.10	M	

Table 5.30: REJ-command/response (Reject)

REJ-command/response (Reject)				
Item No.	Name of information element and field element	EN 300 175-4 [4] reference	Status	Value
1	Address field	7.2	M	
1.1	RES	7.3.1	M	1
1.2	C/R	7.3.2	M	0 - 1
1.3	SAPI	7.3.3	M	0
1.4	LLN	7.3.5	M	1 (C3001) 2 - 7 (C3002)
1.5	NLF	7.3.4, 9.2.2.1	M	0 - 1

REJ-command/response (Reject)				
Item No.	Name of information element and field element	EN 300 175-4 [4] reference	Status	Value
2	Control field	7.4	M	
2.1	S (Supervisory function bits)	7.5.2.4	M	2
2.2	P/F	7.5.1, 9.2.1	M	0 (C3001) 0 - 1 (C3002)
2.3	N(R)	7.5.2.6	M	0 - 1 (C3001) 0 - 7 (C3002)
3	Checksum field	7.10	M	

C3001: IF class A service supported

C3002: IF class B service supported

Table 5.31: SABM-command (Set Asynchronous Balanced Mode)

SABM-command (Set Asynchronous Balanced Mode)				
Item No.	Name of information element and field element	EN 300 175-4 [4] reference	Status	Value
1	Address field	7.2	M	
1.1	RES	7.3.1	M	1
1.2	C/R	7.3.2	M	1
1.3	SAPI	7.3.3	M	0
1.4	LLN	7.3.5	M	1 (C3101) 2 - 7 (C3102)
1.5	NLF	7.3.4, 9.2.2.1	M	0 - 1
2	Control field	7.4	M	
2.1	U (Unnumbered function bits) length: 5 BIT (2 + 3)	7.5.2.4	M	7
2.2	P	7.5.1, 9.2.1	M	0 (C3101) 1 (C3102)
3	Checksum field	7.10	M	

C3101: IF class A service supported

C3102: IF class B service supported

Table 5.32: DM-response (Disconnect Mode)

DM-response (Disconnect Mode)				
Item No.	Name of information element and field element	EN 300 175-4 [4] reference	Status	Value
1	Address field	7.2	M	
1.1	RES	7.3.1	M	1
1.2	C/R	7.3.2	M	0
1.3	SAPI	7.3.3	M	0
1.4	LLN	7.3.5	M	1 (C3201) 2 - 7 (C3202)
1.5	NLF	7.3.4, 9.2.2.1	M	0-1
2	Control field	7.4	M	
2.1	U (Unnumbered function bits) length: 5 BIT (2 + 3)	7.5.2.4	M	3
2.2	F	7.5.1, 9.2.1	M	0 (C3201) 0 - 1 (C3202)
3	Checksum field	7.10	M	

C3201: IF class A service supported

C3202: IF class B service supported

Table 5.33: UI-command (Unnumbered Information)

UI-command (Unnumbered Information)				
Item No.	Name of information element and field element	EN 300 175-4 [4] reference	Status	Value
1	Address field	7.2	M	
1.1	RES	7.3.1	M	1
1.2	C/R	7.3.2	M	1
1.3	SAPI	7.3.3	M	0
1.4	LLN	7.3.5	M	1 (C3301) 2 - 7 (C3302)
1.5	NLF	7.3.4, 9.2.2.1	M	0-1
2	Control field	7.4	M	
2.1	U (Unnumbered function bits) length: 5 BIT (2 + 3)	7.5.2.4	M	0
2.2	P	7.5.1, 9.2.1	M	0 (C3301) 0 - 1 (C3302)
3	Checksum field	7.10	M	

C3301: IF class A service supported

C3302: IF class B service supported

Table 5.34: DISC-command (Disconnect)

DISC-command (Disconnect)				
Item No.	Name of information element and field element	EN 300 175-4 [4] reference	Status	Value
1	Address field	7.2	M	
1.1	RES	7.3.1	M	1
1.2	C/R	7.3.2	M	1
1.3	SAPI	7.3.3	M	0
1.4	LLN	7.3.5	M	1 (C3401) 2 - 7 (C3402)
1.5	NLF	7.3.4, 9.2.2.1	M	0-1
2	Control field	7.4	M	
2.1	U (Unnumbered function bits) length: 5 BIT (2 + 3)	7.5.2.4	M	8
2.2	P	7.5.1, 9.2.1	M	0 (C3401) 0 - 1 (C3402)
3	Checksum field	7.10	M	

C3401: IF class A service supported

C3402: IF class B service supported

Table 5.35: UA response (Unnumbered ACK)

UA response (Unnumbered ACK)				
Item No.	Name of information element and field element	EN 300 175-4 [4] reference	Status	Value
1	Address field	7.2	M	
1.1	RES	7.3.1	M	1
1.2	C/R	7.3.2	M	0
1.3	SAPI	7.3.3	M	0
1.4	LLN	7.3.5	M	1 (C3501) 2 - 7 (C3502)
1.5	NLF	7.3.4, 9.2.2.1	M	0 - 1
2	Control field	7.4	M	
2.1	U (Unnumbered function bits) length: 5 BIT (2 + 3)	7.5.2.4	M	12
2.2	F	7.5.1, 9.2.1	M	0 (C3501) 0 - 1(C3502)
3	Checksum field	7.10	M	

C3501: IF class A service supported

C3502: IF class B service supported

5.5.4.5 C-plane timers

Table 5.36: C-plane timers

Supported timers				
Item No.	Timer	EN 300 175-4 [4] reference	Status	Value
1	DL.00	A.1	M	2 s
2	DL.01	A.1	M	2 s
3	DL.02	A.1	M	2 s
4	DL.03	A.1	M	2 s
5	DL.04 (C _F routed frames)	A.1	M	1 s
6	DL.04 (C _S routed frames)	A.1	M	2 s
7	DL.05	A.1	M	10 s
8	DL.06	A.1	M	4 s
7	DL.07	A.1	M	2 s

5.5.4.6 C-plane protocol error handling

Table 5.37: General error handling

Supported procedures			
Item No	Operation - General procedures	EN 300 175-4 [4] reference	Status
1	Invalid frames are discarded	9.2.9.1	M

Table 5.38: Class A error recovery

Supported procedures			
Item No	Operation - General procedures	EN 300 175-4 [4] reference	Status
1	Waiting for acknowledgement, timer DL.04 expiry	9.2.3.6	C3801

C3801: IF class A service supported THEN M ELSE I

Table 5.39: Class B error handling and recovery

Supported procedures			
Item No	Operation - General procedures	EN 300 175-4 [4] reference	Status
1	N(S) sequence error	9.2.9.2.1	C3901
2	N(R) sequence error	9.2.9.2.2	C3901
3	Timer recovery condition	9.2.9.2.3	C3901

C3901: IF class B service supported THEN M ELSE I

Table 5.40: Unknown or invalid frames (which provoke error handling as requested in table 5.37)

Supported frames			
Item No	Frame types	GAP Reference	Status
1	Unknown frames	9.2.9.1, 7.11	M
2	Invalid frames	6.1.5	M

5.6 Network layer requirements

5.6.1 Requirements Point-To-Point (PTP) service

The <<IWU-TO-IWU>> information element in the {IWU-INFO} message shall be used to carry the application information in the active state of CC. The messages shall be segmented by using the <<SEGMENTED-INFO>> element in the {IWU-INFO} message if the original {IWU-INFO} message length exceeds 58 octets. The rules for segmentation are specified in clause A.3.

If LRMS PTP is used during ongoing call a separate CC instance shall be required for LRMS.

5.6.2 Requirements Point-To-Multipoint (PTM) service

The Network layer provisions shall include the Connectionless Message Service (CLMS) entity. For the service the rules of the clause 12 of EN 300 175-5 [5] variable length service shall apply.

The <<PORTABLE IDENTITY>> element of the {CLMS-VARIABLE} message shall be used for the addressing. For the addressing of the PPs the connectionless TPUI shall be used as specified EN 300 175-5 [5], subclause 14.3 (see particularly subclause 14.3.2 paragraph 4). The interworking annexes to specific services shall define the type of addressing used as well as the way external addresses are mapped into the DECT addresses.

The inclusion of the <<IWU-TO-IWU>>, <<MMS-GENERIC-HDR>> and <<MMS-OBJECT-HDR>> shall be required in the {CLMS-VARIABLE} message.

The messages shall be segmented by using the <<SEGMENTED-INFO>> element in the {CLMS-VARIABLE} message if the {CLMS-VARIABLE} message length exceeds 58 octets. The segmentation rules as specified in EN 300 175-5 [5] in subclauses 12.3.2.1 and 12.3.2.2 shall apply. For the segmentation procedure the elements defined mandatory in {CLMS-VARIABLE} in EN 300 175-5 [5] shall be present in all messages. The segmentation shall apply to the <<IWU-TO-IWU>> element only.

NOTE: This implies that other elements, such as the <<MMS-GENERIC-HDR>> and <<MMS-OBJECT-HDR>>, are not duplicated for subsequent {CLMS-VARIABLE} messages when segmentation is used.

5.7 Management entity requirements

The management entity requirements of EN 300 444 [9] shall apply for the Point-To-Point (PTP) service.

The connectionless link procedures shall be provided for the Point-To-Multipoint (PTM) service.

5.8 Generic interworking conventions

5.8.1 MMSP procedures

The MMSP elements of procedures and message definitions are defined in subclause 6.3 of the present document. For the Point-To-Multipoint (PTM) service, only {MMS-SEND}, {MMS-STATUS}, {MMS-EXT-CMD} and {MMS-ESC-CMD} are applicable.

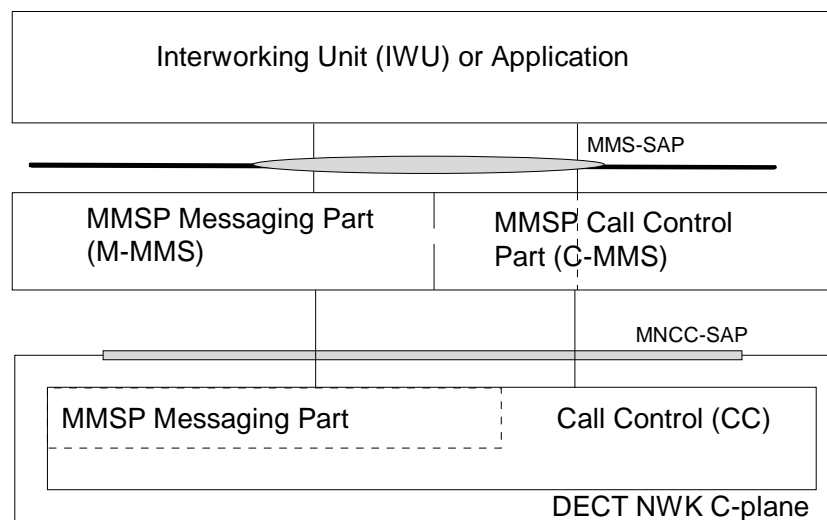
The MMSP information elements are defined in subclause 6.4 of the present document.

The MMSP implementation on lower layers has been defined in annex A of the present document.

5.8.2 Multimedia Messaging Service - Service Access Point (MMS-SAP)

The MMS-SAP is the service access point on the top of MMSP that shall be accessed by the interworking unit (IWU) or the application. The M-MMS-SAP primitives are used for LRMS message control and for requesting LRMS message transportation or reception directly by the upper layer application. The main message control functionality for different services is done as defined in an appropriate service interworking definition.

The MMS-SAP primitives for the Point-To-Point (PTP) service have been defined in subclause 5.8.3 of the present document. The MMS-SAP primitives for the Point-To-Multipoint (PTM) service have been defined in subclause 5.8.4 of the present document.



IWU: Interworking Unit.

Figure 5.3: The LRMS protocol model

5.8.3 MMSP primitives Point-To Point (PTM) service

5.8.3.1 C-MMS primitives

The following primitives are provided by MMS-SAP for the control of C-MMS part of the MMSP.

Table 5.41

Primitive	Req	Cfm	Ind	Res
C-MMS-SETUP-	x		x	
C-MMS-CONNECT-	x	x	x	
C-MMS-RELEASE-	x	x	x	x

5.8.3.2 M-MMS primitives

The following primitives are provided by MMS-SAP for the control of M-MMS part of the MMSP.

Table 5.42

Primitive	Req	Cfm	Ind	Res
M-MMS-SEND-	x		x	
M-MMS-SEND-REQ	x		x	
M-MMS-SEND-RPY	x		x	
M-MMS-RETRIEVE-	x		x	
M-MMS-RETRIEVE-HDR	x		x	
M-MMS-RETRIEVE-RPY	x		x	
M-MMS-STATUS-	x		x	
M-MMS-STATUS-RPY	x		x	
M-MMS-EXT-CMD-	x		x	
M-MMS-EXT-CMD-RPY	x		x	
M-MMS-ESC-CMD-	x		x	
M-MMS-ESC-CMD-RPY	x		x	

5.8.3.3 Parameters

The parameters for each primitive are described in subclause 6.4 of the present document.

5.8.4 MMSP primitives Point-To-Multipoint Serive

5.8.4.1 M-MMS primitives

The following primitives are provided by MMS-SAP for the control of M-MMS part of the MMSP.

Table 5.43

Primitive	Req	Cfm	Ind	Res
PTM-MMS-SEND-	x		x	
PTM-MMS-STATUS-	x		x	
PTM-MMS-EXT-CMD-	x		x	
PTM-MMS-ESC-CMD-	x		x	

5.8.4.2 Parameters

The parameters for each primitive are described in subclause 6.4 of the present document.

6 MMSP protocol definition

6.1 General

The MMS is a stateless protocol offering a service defined by primitives, with peer-to-peer interactions described where appropriate in terms of virtual messages. These virtual messages and their information elements are implemented by mappings onto network layer messages and information elements. This annex describes the MMSP protocol layer only, whereas the mappings to the network layer are described in annex A.

Not all the MMSP messages and procedures are required in order to interwork to a specific interworking service i.e. a minimum subset of the following procedures, information elements and messages can be selected in order to facilitate interworking. However there is no limitation on implementing others in addition to the minimum required set. The procedures are defined as interactions between the MMS application layer or IWU and the MMSP primitives. The primitives, messages and procedures are divided into M-MMS and C-MMS parts.

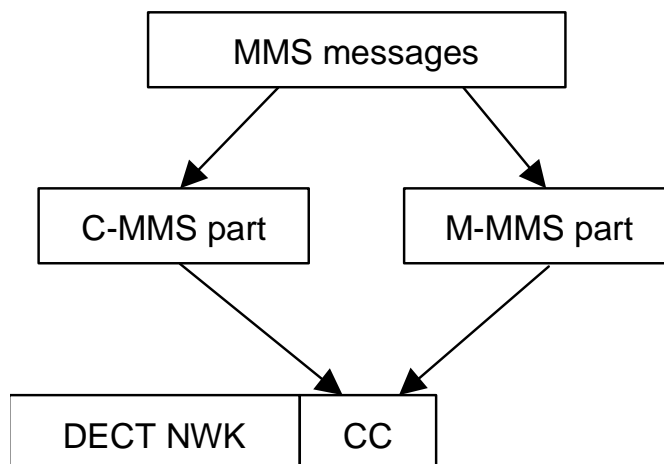


Figure 6.1: The MMS message relationships

In the procedure specification the MMS entity which initiates a procedure is called the MMS initiating entity and the MMS entity which is the receiving part is called the MMS receiving entity.

6.2 Functional description

6.2.1 General

This subclause defines the MMS definitions and functional model that are used in MMS service definition. The purpose of this subclause is to clarify the concepts relating to the MMS, its architecture, basic functionality and the relationship of the MMS to the DECT protocol layer model and to the outside networks. The concepts of vertical and horizontal models are only used to clarify the MMS interactions in this ETS and they were defined only for the purposes of clarity.

The horizontal MMS model defined in this subclause specifies the position of the MMS and the MMS entities in relation to the outside networks and DECT physical and logical entities (FPs, PPs and IWUs).

The architecture subclause defines the MMS layer internal structure.

The vertical MMS model defined in this subclause 6.2.4 specifies the position of the MMS in the DECT layer structure: relation to the DECT Network layer (NWK) and to the application/Interworking Unit (IWU).

6.2.2 MMS relations to outside networks (horizontal model)

This subclause defines the MMS horizontal definitions i.e. the relations of the messaging service to the outside networks as well as the different DECT MMS and outside (IWU) network entities. Figure 6.2 illustrates some of the MMS definitions.

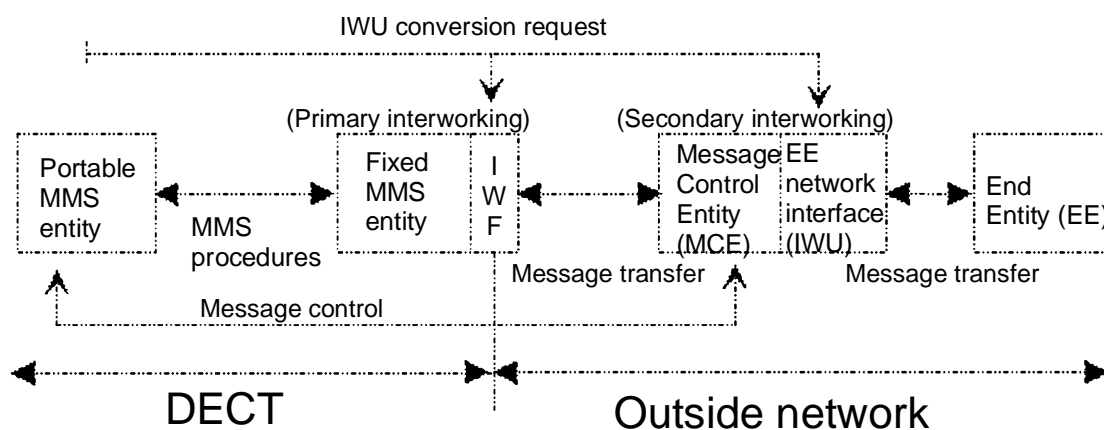


Figure 6.2: The MMS horizontal functional model

Portable MMS entity: PP which supports the MMS protocol (MMSP).

Fixed MMS entity: FP which supports the MMS protocol (MMSP) and which has an Interworking Function (IWF) between the MMSP and the outside network.

MMS entity (portable MMS entity or fixed MMS entity): entity with MMS messaging capabilities.

MMS procedures: take place between MMS entities. The procedures provide means for message and file transfer or retrieval between these MMS entities. Also a set of controlling procedures are available for the remote transactions focused into a MMS message/file stored/handled by the Message Control Entity (MCE). The MCE may send status information data as a response to a control procedure or to a specific request set by other MMS procedures.

Message Control Entity (MCE): server which is responsible for the control of the message sent or requested by a MMS entity or the EE. It resides on the outside network side of the fixed MMS entity IWU. It is always logically separate from the fixed MMS entity, although they may be physically integrated. The protocol between the fixed MMS entity and the MCE as well as the protocol between the MCE and the EE (MCE IWU conversion) may be selected by means of MMS messages (primary IWU conversion). The selection of these protocols can be done by the MCE and/or by the fixed MMS entity. The MCE can be, for instance, a GSM Short message service Centre (SC) or a facsimile server in LAN environment.

The Portable MMS entity can control the messages in the MCE i.e. request the status, cancel the message forwarding etc. After the MCE has finished forwarding the message (if it was requested to do so) the message cannot be controlled anymore. In this case only status information regarding the message can be requested from or sent by the MCE. The MCE may also send a message (or message acknowledgement) to the PP by establishing a connection to the Fixed MMS entity and requesting connection establishment to the appropriate Portable MMS Entity.

End Entity (EE): is the final addressed destination of the message transfer. It is a logically separated from the MCE by either a network or a software interface. It does not necessarily understand MMS messaging i.e. the Fixed MMS Entity (FP IWU conversion) or the MCE end user network interface (secondary IWU conversion) may do protocol conversion according to the requests set in the MMS messages. The EE can also be another MMS entity. For instance, the Fixed MMS Entity can forward a MMS message to another Portable MMS Entity via a MCE.

MMS addressing: the MMS protocol provides for the addressing of the MCE and EE. The MCE address may be provided during the MMS call establishment. The EE address is sent in MMS messages. If no MCE address is present then the message is processed by a default or implicit MCE.

End entity network interface: interface between the MCE and EE. For message transportation a MCE IWU can be requested in a MMS procedure. In this case a protocol conversion can take place according to the request of the MMS procedure or autonomously according to the interworking requirements.

6.2.3 Architecture

6.2.3.1 General

This subclause defines the MMSP virtual layer internal architecture.

The MMS Protocol (MMSP) entity is divided into two separate parts: the MMS call control entity (C-MMS) and the MMS messaging entity (M-MMS). The structure is illustrated in the figure 6.3. The use of the C-MMS and M-MMS primitives is service/application dependent and is described in the specific interworking descriptions.

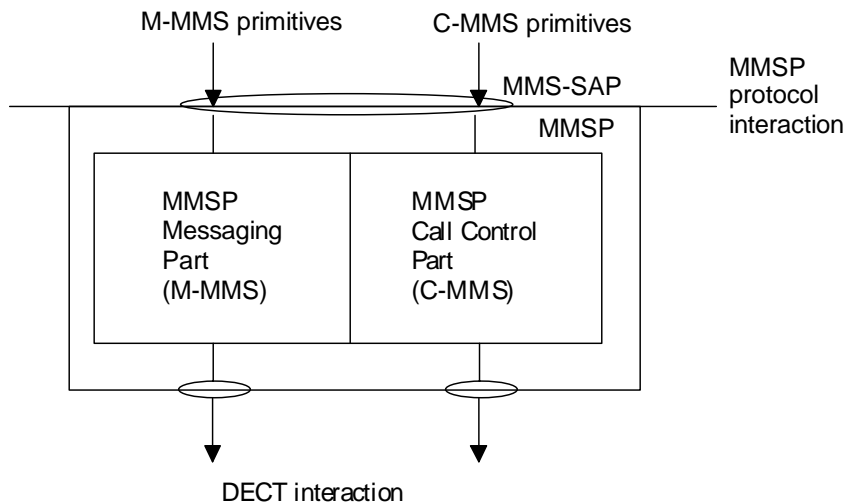


Figure 6.3: MMS internal structure

6.2.3.2 MMSP call control part (C-MMS)

The MMS call control part establishes a connection between a Portable and Fixed MMS entity according to the requests of the upper layer entity (MMS application or IWU). It forwards the call control requests to the lower layers. The C-MMS is controlled through the primitives of the MMS-SAP through which the required information for call establishment is defined.

6.2.3.3 MMSP messaging part (M-MMS)

The MMSP messaging part provides the means for the upper layer (MMS application or IWU) to send and receive MMS specific messages with MMS specific information between a Portable and Fixed MMS entity. The M-MMS part can only function if the C-MMS part has established a connection between these two horizontal entities according to the request of the upper layer entity. M-MMS provides a set of primitives to the upper layer and it contains MMSP message framing rules. The service access point for the primitives is the MMS-SAP. The use of the M-MMS primitives for a given MMS service is defined in the service/application interworking definitions and in the generic MMS procedures.

The MMSP data message information that is handled by the M-MMS part can be divided into two data parts:

secondary part provides the functionality to convey the pure data the user (application) wants to transmit e.g. a facsimile image data, the short message text, etc.

primary part provides the functionality to convey the additional control data that is combined into the MMS message such as control information to the server, time stamp information, recipient address, response request.

6.2.4 MMS relations to the upper/lower layers (vertical model)

6.2.4.1 General

This subclause defines the MMS vertical relations. That is how the MMSP interacts with the protocol layers on the top and below it. The interworking of the protocol is defined in both directions: up to the MMS application (in the PP) or the interworking unit (in the FP) and down to the DECT layers.

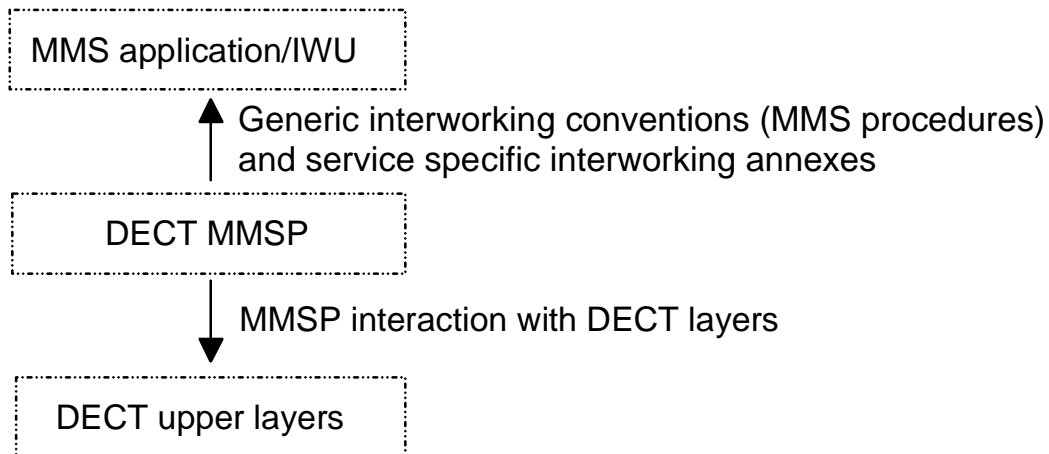


Figure 6.4: General vertical MMS model

The MMSP functions as a stateless protocol.

The task of the MMSP is to packetize the information received from the application, to add MMSP specific control information and to request the network layer to transport the frames over the air interface to its peer MMSP entity. The MMSP layer provides primitives for call control and MMS transportation for the application layer and the entity uses NWK and/or DLC primitives. In general the MMS only does framing and in fact the call control primitives it offers to the application are network layer primitives. The procedures relating to call control behaviour are described in the interworking definitions due to the different type of functional demand by different services.

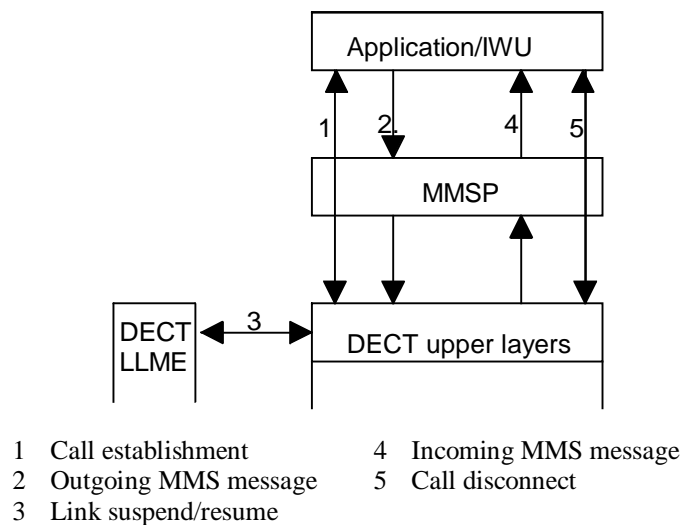


Figure 6.5: MMS interactions

6.2.4.2 MMS relation to the DECT upper layers

6.2.4.2.1 General

The interface between the MMSP protocol layer and the DECT upper layers is defined as a set of rules how the DECT NWK primitives are used for MMS call control and MMS messaging.

6.2.4.2.2 M-MMS

M-MMS uses DECT Call Control messaging and information elements for the MMS messages transfer. Thus M-MMS uses the Call Control services. The interaction as well as the M-MMS procedures are defined as a mapping between the MMSP protocol messages and DECT NWK and DLC messages in annex A of the present document.

6.2.4.2.3 C-MMS

C-MMS uses the normal DECT Call Control procedures for call establishment, suspension, resumption and release. Thus C-MMS is the same as DECT Call control entity. The interaction as well as the C-MMS procedures are defined as a mapping between the MMSP layer and DECT NWK messages in annex A of the present document.

6.2.5 MMS relations to outside networks (vertical and horizontal model)

6.2.5.1 General

This subclause defines the MMS relations according to the horizontal model i.e. how the MMS protocol relates through the vertical model to the Portable MMS entity, Fixed MMS entity with Interworking Unit, MCE and outside network. The general model containing elements from both models is illustrated in figure 6.6. The functions in the figure in the EE are dependent on the accessed service.

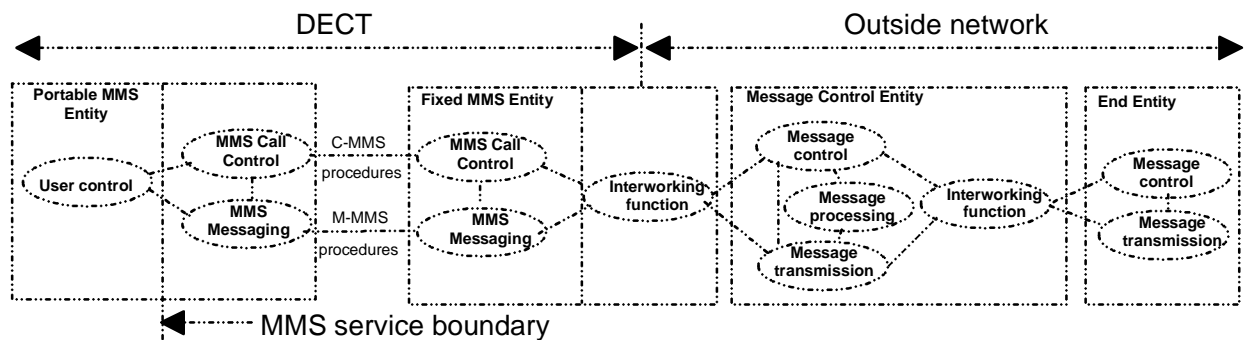


Figure 6.6: The MMS general functional model

6.2.5.2 Phases of the horizontal interactions

6.2.5.2.1 General

Figure 6.7 illustrates a general MMS horizontal functional model. It should be noted that the phases in the figure are not MMS procedures but basic functions required for reaching the interworking services. Those phases that have been drawn with dotted lines are optional i.e. these are not required by all services. A phase is part of a MMS procedure, either C-MMS or M-MMS, thus a MMS procedure consists of MMS phases defined here. Each phase is defined next with a reference to the figure 6.7 which illustrates a PP originated messaging transfer.

6.2.5.2.2 PP originated outgoing MMS call

Phase 1 a) Establish a call. This is a C-MMS phase. Its purpose is to establish a DECT air interface connection with MMS capabilities.

Phase 1 b) Select an FP IWU and negotiate the service. This is a C-MMS phase. Its purpose is to select the Interworking Unit in the Fixed MMS entity in order to facilitate the required message mappings and access to the requested service.

Phase 1 c) Request the MCE. This is a C-MMS phase. The MCE is accessed through a network to which the Fixed MMS entity provides access. This phase is used to address the MCE (for instance, Internet address, GSM SMS SC number, etc.). The MCE selected by the MMS protocol may be a default or implicit MCE.

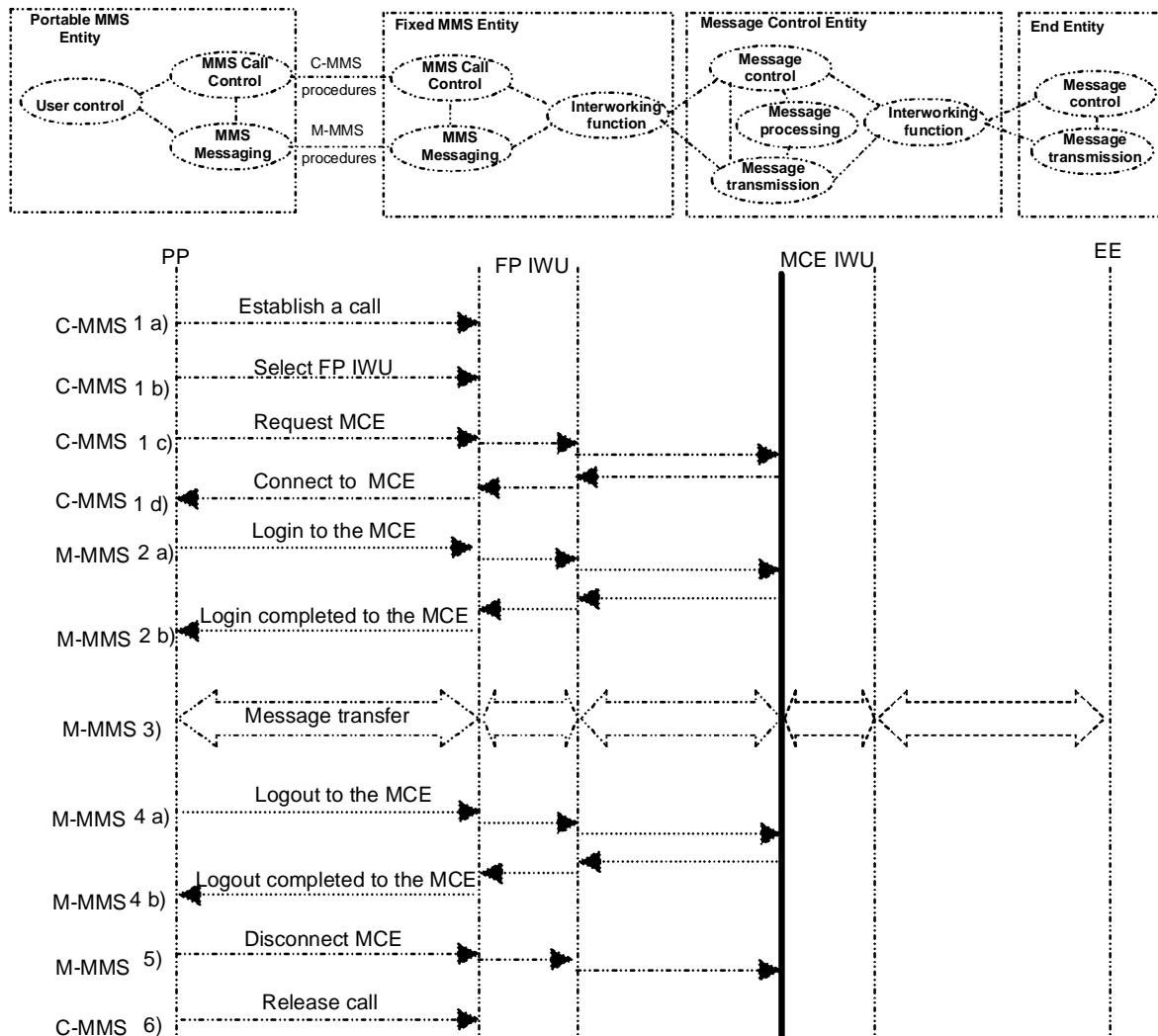


Figure 6.7: The horizontal functions related to MMS messaging

Phase 1 d). Connect to MCE. This is a C-MMS phase. The connection is established through the network into the MCE.

Phase 2 a). Send login request to MCE. This is an optional M-MMS phase. In some cases a login phase by a user or application is required to permit access to the service provided by the server (for instance, in the FTP service case).

Phase 2 b). Receive login reply from MCE. This is an optional M-MMS phase. In some cases login connect confirmation information is sent to the user by the MCE (the server).

Phase 3. Message transfer. This is a M-MMS phase. Contains messages that are transferred between the portable MMS entity and the MCE. Messages sent to a MCE may be forwarded to an EE. A typical example of this phase is illustrated in figure 9.

Phase 4 a). Send logout request to MCE. This is an optional M-MMS phase. In some cases a logout phase by a user or application is required to close a connection to the MCE.

Phase 4 b). Receive logout reply from MCE. This is an optional M-MMS phase. In some cases a logout confirmation information is sent to the user by the MCE (the server).

Phase 5. Disconnect from MCE. This is a M-MMS phase. This is a phase used to disconnect the connection to a server residing in a network (for instance, in Internet).

Phase 6. Release call. This is a C-MMS phase. This is a phase used to disconnect the air interface.

6.2.5.2.3 Example of a typical PP initiated message

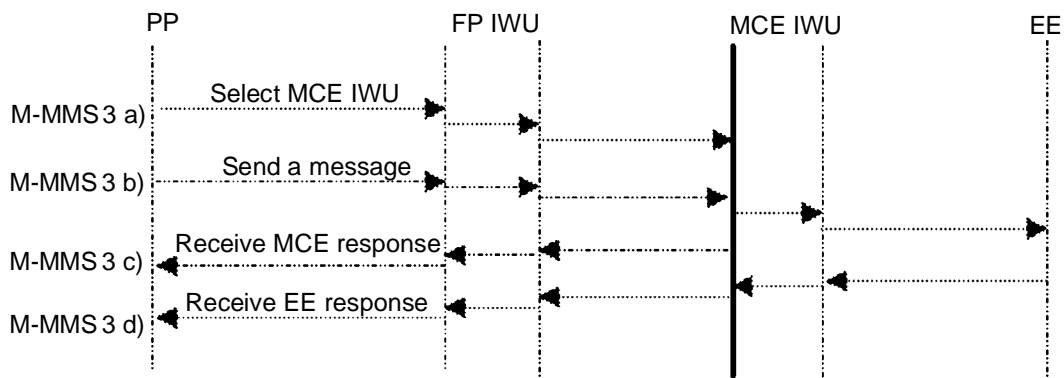


Figure 6.8: A typical phase 3 message change sequence

Phase 3 a). Select MCE IWU. This is a M-MMS phase. The purpose is to select the Interworking Unit in the MCE in order to facilitate the required message mappings or to reach required service.

Phase 3 b). Send a message. This is a M-MMS phase. This phase contains the actual message that is sent to the MCE for processing. Depending on the service either the MCE replies itself or forwards the message and then replies.

Phase 3 c). Receive MCE response. This is a M-MMS phase. The MCE has sent a response to the previously sent message.

Phase 3 d). Receive end entity response. This is a M-MMS phase. The MCE may send a response received from the EE to the MMS portable entity.

A set of consecutive phases can be combined into a single C- or M-MMS procedure. For example, phases 1a (establish a radio link), 1b (select FP IWU) and 1c (request the MCE) can be done with a CC-SETUP message.

6.2.5.2.4 PP terminated incoming MMS call

A PP terminated messaging consist only of phases 1 a), 1 b), 3 and 6. In this case the reference to the FP is replaced with PP as well as the direction of the phases is opposite to the PP originated case.

Phase 1 a) Establish a call.

Phase 1 b) Select a PP IWU and negotiate the service.

Phase 3 Message transfer.

Phase 3 b) Receive a message.

Phase 3 c) Send a MCE response.

Phase 6 Release call.

No other phases are required.

6.3 MMSP protocol messages and procedures

6.3.1 C-MMS messages and procedures

There are no C-MMS virtual messages or procedures. All service requests to the C-MMS entity via its service primitives, and their associated parameters are mapped directly onto network layer CC primitives and parameters on a one-to-one basis as described in annex A.

6.3.2 M-MMS

The M-MMS protocol layer consists of a set of messages which are mapped directly from or to the corresponding M-MMS service primitives defined in clause 11. For transmission, these messages are parsed and directly mapped onto protocol elements (messages, information elements and SDUs) of the DECT C-plane according to the rules given in annex A. On reception, the protocol elements received by the DECT C-plane are parsed into M-MMS messages which are then mapped onto the corresponding M-MMS service primitives.

For clarity, the procedures which the higher-layer entity needs to adopt in the usage of the M-MMS service primitives have been presented here as elements of procedure for the use of the M-MMS messages, to which they are functionally equivalent.

NOTE: The M-MMS itself is a stateless protocol, and all implied states and procedures are the responsibility of the higher-layer entity, and will not be checked by the M-MMS.

6.3.2.1 Summary of the M-MMS messages

Table 6.1: Summary of M-MMS messages

Message	Direction	Subclause
MMS-SEND	Both	6.3.2.2.1
MMS-SEND-REQ	Both	6.3.2.3.1
MMS-SEND-RPY	Both	6.3.2.2.2 & 6.3.2.3.2
MMS-RETRIEVE	Both	6.3.2.4.1
MMS-RETRIEVE-HDR	Both	6.3.2.5.2
MMS-RETRIEVE-RPY	Both	6.3.2.4.2 & 6.3.2.5.2
MMS-EXT-CMD	Both	6.3.2.6.1
MMS-EXT-CMD-RPY	Both	6.3.2.6.2
MMS-STATUS	Both	6.3.2.7.1
MMS-STATUS-RPY	Both	6.3.2.7.2
MMS-ESC-CMD	Both	6.3.2.8.1
MMS-ESC-CMD-RPY	Both	6.3.2.8.2

The M-MMS procedures shall only be invoked by the higher-layer entity when the CC entity, as seen by the higher-layer entity through the C-MMS service interface, is in the active state.

The messages are composed of a set of information elements. The first element <<MMS-Header>> contains the coding defining which message is being sent.

6.3.2.2 MMS SEND procedure

The MMS SEND procedure shall be used by an application or MCE to send a message to its peer. The procedure may be used in either direction (PP to FP and FP to PP). The reply is an optional feature which may be requested with the "Reply from MCE" or "Reply from MCE and EE" codings in the "reply request" field of the first IE of the {MMS-SEND} message. The content of the {MMS-SEND} message is defined in the table A.2 and of {MMS-SEND-RPY} in the table A.3. The procedures for the use of the MMS-Message Identifier shall be followed.

Upon receipt of a M_MMS_SEND-req primitive from the upper layer the M-MMS part of the MMS initiating entity shall send a corresponding {MMS-SEND} message to the receiving MMS entity. When a MMS entity receives a {MMS-SEND} message it shall issue a M_MMS_SEND-ind to the upper layer. If the <<MMS-Header>> is set to "reply requested" then the higher entity at the receiver shall upon completion of the appropriate action issue a M_MMS_SEND-RPY-req primitive and the MMS entity shall send a corresponding {MMS-SEND-RPY} message.

Upon receipt of a {MMS-SEND-RPY} message from the receiving MMS entity the initiating MMS entity shall issue a M_MMS_SEND_RPY-ind primitive to the upper layer.

If the "Reply request" coding in the <<MMS-GENERIC-HDR>> element is set to "reply from EE", then the {MMS-SEND-RPY} message shall not be sent by the peer entity, and the initiating higher-layer entity shall expect the response in an M_MMS_STATUS_RPY-ind primitive.

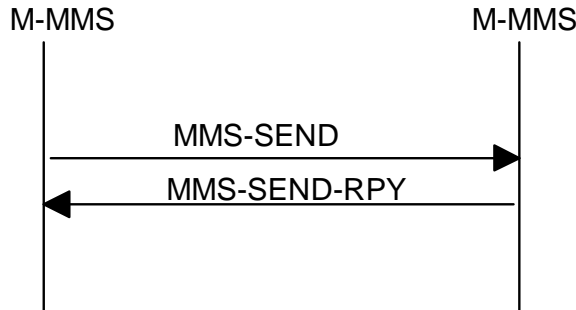


Figure 6.9: MMS send procedure options

6.3.2.2.1 {MMS-SEND} message contents

Table 6.2

{MMS-SEND} IEs	Syntax status	Description
PRIMARY PART		
MMS-Generic-Hdr	M	MMS command and service
Called-Party-Number	O	EE address
Called-Party-Subaddr	O	EE subaddress
Calling-Party-Number	O	initiating entity (PP or MCE) address
Time-Date	O	time & date of various message aspects
MMS-Obj-Hdr	M	user data length and type
MMS-Ext-Hdr	O	service or message specific attributes
Segmented-Info	O	segments of a network layer message
Repeat-Indicator	O	repetition of a particular IE
SECONDARY PART		
MMS-Ext-Hdr	O	service or message specific attributes
Repeat-Indicator	O	repetition of a particular IE
User Data	O	this IE contains the User Data

6.3.2.2.2 {MMS-SEND-RPY} message contents

Table 6.3

{MMS-SEND-RPY} IEs	Syntax status	Description
PRIMARY PART		
MMS-Generic-Hdr	M	MMS command and service
Time-Date	O	time & date of various message aspects
MMS-Obj-Hdr	O	User Data length and type
MMS-Ext-Hdr	O	service or message specific attributes
Segmented-Info	O	segments of a network layer message
Repeat-Indicator	O	repetition of a particular IE
SECONDARY PART		
MMS-Ext-Hdr	O	service or message specific attributes
Repeat-Indicator	O	repetition of a particular IE

6.3.2.3 MMS SEND-REQ procedure

The MMS SEND-REQ(uest) procedure shall be used by an application or MCE to provide information to its peer about a message it intends to send and shall require a reply, in order to enable the application or MCE to decide whether to initiate a MMS-SEND procedure. A reply shall always be requested, in the "reply request" field. The content of the {MMS-SEND-REQ} message is defined in the table A.4 and of {MMS-SEND-RPY} in the table A.5. The procedures for the use of the MMS-Message Identifier shall be followed.

Upon receipt of a M_MMS_SEND_REQ-req primitive from the upper layer the M-MMS part of the MMS initiating entity shall send a corresponding {MMS-SEND-REQ} message to the receiving MMS entity. When a MMS entity receives a {MMS-SEND-REQ} message it shall issue a M_MMS_SEND_REQ-ind to the upper layer. Upon completion of the appropriate action the receiver higher layer entity shall issue a M_MMS_SEND_RPY-req primitive and the MMS entity shall send a corresponding {MMS-SEND-RPY} message. Upon receipt of a {MMS-SEND-RPY} message from the receiving MMS entity the initiating MMS entity shall issue a M_MMS_SEND_RPY-ind primitive to the upper layer.

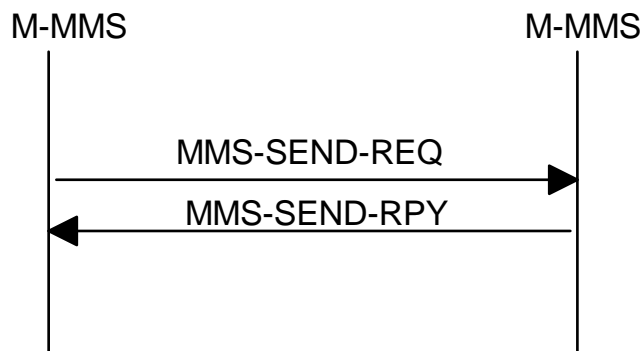


Figure 6.10: MMS send procedure options

6.3.2.3.1 {MMS-SEND-REQ} message contents

Table 6.4

{MMS-SEND-REQ} IEs	Syntax status	Description
PRIMARY PART		
MMS-Generic-Hdr	M	MMS command and service
Called-Party-Number	O	EE address
Called-Party-Subaddr	O	EE subaddress
Calling-Party-Number	O	initiating entity (PP or MCE) address
Time-Date	O	time & date of various message aspects
MMS-Obj-Hdr	M	user data length and type
MMS-Ext-Hdr	O	service or message specific attributes
Segmented-Info	O	segments of a network layer message
Repeat-Indicator	O	repetition of a particular IE
SECONDARY PART		
MMS-Ext-Hdr	O	service or message specific attributes
Repeat-Indicator	O	repetition of a particular IE

6.3.2.3.2 {MMS-SEND-RPY} message contents

Table 6.5

{MMS-SEND-RPY} IEs	Syntax status	Description
PRIMARY PART		
MMS-Generic-Hdr	M	MMS command and service
Time-Date	O	time & date of various message aspects
MMS-Obj-Hdr	O	user data length and type
MMS-Ext-Hdr	O	service or message specific attributes
Segmented-Info	O	segments of a network layer message
Repeat-Indicator	O	repetition of a particular IE
SECONDARY PART		
MMS-Ext-Hdr	O	service or message specific attributes
Repeat-Indicator	O	repetition of a particular IE

6.3.2.4 MMS RETRIEVE procedure

The MMS RETRIEVE procedure shall be used by an application or MCE to request from its peer the transmission of a message or messages, and shall always involve a reply, in order to convey the retrieved information or to provide details about its denial. The reply shall be requested in the "reply request" field. The content of the {MMS-RETRIEVE} message is defined in the table A.6 and of {MMS-RETRIEVE-RPY} in the table A.7. The procedures for the use of the MMS-Message Identifier shall be followed.

Upon receipt of a M_MMS_RETRIEVE-req primitive from the upper layer the M-MMS part of the MMS initiating entity shall send a corresponding {MMS-RETRIEVE} message to the receiving MMS entity. When a MMS entity receives a {MMS-RETRIEVE} message it shall issue a M_MMS_RETRIEVE-ind to the upper layer. Upon completion of the appropriate action the receiver higher layer entity shall issue a M_MMS_RETRIEVE_RPY-req primitive and the MMS entity shall send a corresponding {MMS-RETRIEVE-RPY} message. Upon receipt of a {MMS-RETRIEVE-RPY} message from the receiving MMS entity the initiating MMS entity shall issue a M_MMS_RETRIEVE_RPY-ind primitive to the upper layer.

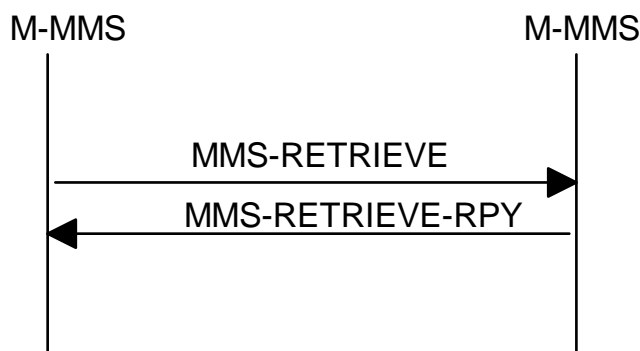


Figure 6.11: MMS retrieve procedure options

6.3.2.4.1 {MMS-RETRIEVE} message contents

Table 6.6

{MMS-RETRIEVE} IEs	Syntax status	Description
PRIMARY PART		
MMS-Generic-Hdr	M	MMS command and service
Called-Party-Number	O	EE address
Called-Party-Subaddr	O	EE subaddress
Calling-Party-Number	O	initiating entity (PP or MCE) address
Time-Date	O	time & date of various message aspects
MMS-Obj-Hdr	O	user data length and type
MMS-Ext-Hdr	O	service or message specific attributes
Segmented-Info	O	segments of a network layer message
Repeat-Indicator	O	repetition of a particular IE
SECONDARY PART		
MMS-Ext-Hdr	O	service or message specific attributes
Repeat-Indicator	O	repetition of a particular IE

6.3.2.4.2 {MMS-RETRIEVE-RPY} message contents

Table 6.7

{MMS-RETRIEVE-RPY} IEs	Syntax status	Description
PRIMARY PART		
MMS-Generic-Hdr	M	MMS command and service
Time-Date	O	time & date of various message aspects
MMS-Obj-Hdr	M	user data length and type
MMS-Ext-Hdr	O	service or message specific attributes
Segmented-Info	O	segments of a network layer message
Repeat-Indicator	O	repetition of a particular IE
SECONDARY PART		
MMS-Ext-Hdr	O	service or message specific attributes
Repeat-Indicator	O	repetition of a particular IE
User Data	O	this IE contains the User Data
NOTE: If the procedure was successful the requested data is in the User Data field.		

6.3.2.5 MMS RETRIEVE-HDR procedure

The MMS RETRIEVE-H(ead)D(e)R procedure shall be used by an application or MCE to request information from its peer about a message or messages it intends to retrieve, and shall always require a reply, in order to enable the application or MCE to decide upon whether to initiate a MMS-RETRIEVE procedure. The reply shall be requested in the "reply request" field. The content of the {MMS-RETRIEVE-HDR} message is defined in the table A.8 and of {MMS-RETRIEVE-RPY} in the table A.9. The procedures for the use of the MMS-Message Identifier shall be followed.

Upon receipt of a M_MMS_RETRIEVE_HDR-req primitive from the upper layer the M-MMS part of the MMS initiating entity shall send a corresponding {MMS-RETRIEVE-HDR} message to the receiving MMS entity. When a MMS entity receives a {MMS-RETRIEVE-HDR} message it shall issue a M_MMS_RETRIEVE_HDR-ind to the upper layer. Upon completion of the appropriate action the receiver higher layer entity shall issue a M_MMS_RETRIEVE_RPY-req primitive and the MMS entity shall send a corresponding {MMS-RETRIEVE-RPY} message. Upon receipt of a {MMS-RETRIEVE-RPY} message from the receiving MMS entity the initiating MMS entity shall issue a M_MMS_RETRIEVE_RPY-ind primitive to the upper layer.

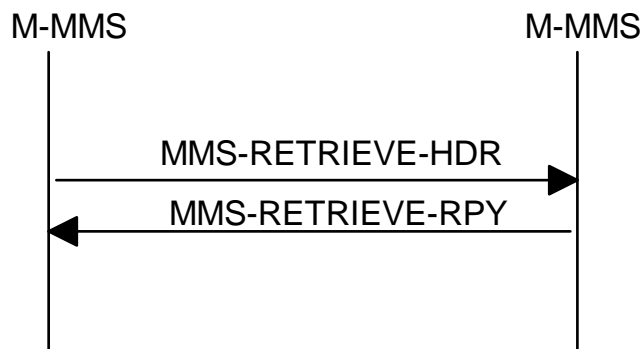


Figure 6.12: MMS retrieve procedure options

6.3.2.5.1 {MMS-RETRIEVE-HDR} message contents

Table 6.8

{MMS-RETRIEVE-HDR} IEs	Syntax status	Description
PRIMARY PART		
MMS-Generic-Hdr	M	MMS command and service
Called-Party-Number	O	EE address
Called-Party-Subaddr	O	EE subaddress
Calling-Party-Number	O	initiating entity (PP or MCE) address
Time-Date	O	time & date of various message aspects
MMS-Obj-Hdr	O	user data length and type
MMS-Ext-Hdr	O	service or message specific attributes
Segmented-Info	O	segments of a network layer message
Repeat-Indicator	O	repetition of a particular IE
SECONDARY PART		
MMS-Ext-Hdr	O	service or message specific attributes
Repeat-Indicator	O	repetition of a particular IE

6.3.2.5.2 {MMS-RETRIEVE-RPY} message contents

Table 6.9

{MMS-RETRIEVE-RPY} IEs	Syntax status	Description
PRIMARY PART		
MMS-Generic-Hdr	M	MMS command and service
Time-Date	O	time & date of various message aspects
MMS-Obj-Hdr	M	user data length and type
MMS-Ext-Hdr	O	service or message specific attributes
Segmented-Info	O	segments of a network layer message
Repeat-Indicator	O	repetition of a particular IE
SECONDARY PART		
MMS-Ext-Hdr	O	service or message specific attributes
Repeat-Indicator	O	repetition of a particular IE
User Data	O	this IE contains the User Data
NOTE: If the procedure was successful the requested data is in the User data field.		

6.3.2.6 MMS-EXT-CMD procedure

The MMS EXT(ended) C(om)M(an)D procedure is intended to enable the user application to control the management of the messages in the MCE. Functions include MCE Login procedures, the cancellation of a forwarding request and the modification of a directory. The control reply (MMS-EXT-CMD-RPY) is an optional reply requested in the MMS-EXT-CMD message. The content of the {MMS-EXT-CMD} message is defined in the table A.10 and {MMS-EXT-CMD-RPY} in the table A.11.

Upon receipt of M_MMS_EXT_CMD-req primitive from the higher-layer entity MMS entity shall send the {MMS-EXT-CMD} message to the receiving MMS entity. When a MMS entity receives a {MMS-EXT-CMD} message it shall issue a M_MMS_EXT_CMD-ind to the upper layer. Upon receipt of M_MMS_EXT_CMD_RPY-req the MMS entity shall issue a {MMS-EXT-CMD-RPY} message. Upon receipt of the {MMS-EXT-CMD-RPY} the initiating MMS entity shall issue a M_MMS_EXT_CMD_RPY-ind primitive to the higher-layer entity.

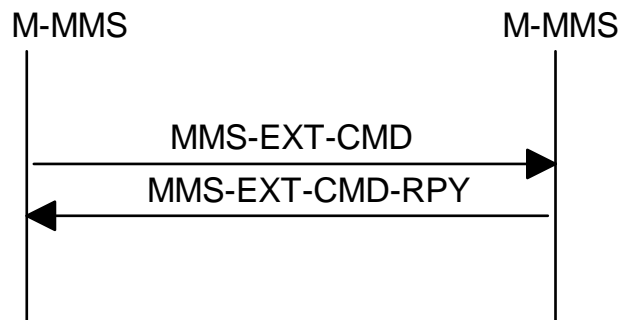


Figure 6.13: MMS Command procedure options

6.3.2.6.1 {MMS-EXT-CMD} message contents

Table 6.10

{MMS-EXT-CMD} IEs	Syntax status	Description
PRIMARY PART		
MMS-Generic-Hdr	M	MMS command and service
Called-Party-Number	O	EE address
Called-Party-Subaddr	O	EE subaddress
Calling-Party-Number	O	initiating entity (PP or MCE) address
Time-Date	O	time & date of various message aspects
MMS-Obj-Hdr	O	user data length and type
MMS-Ext-Hdr	O	service or message specific attributes
Segmented-Info	O	segments of a network layer message
Repeat-Indicator	O	repetition of a particular IE
SECONDARY PART		
MMS-Ext-Hdr	O	service or message specific attributes
Repeat-Indicator	O	repetition of a particular IE
User Data	O	this IE contains the User Data

6.3.2.6.2 {MMS-EXT-CMD-RPY} message contents

Table 6.11

{MMS-EXT-CMD-RPY} IEs	Syntax status	Description
PRIMARY PART		
MMS-Generic-Hdr	M	MMS command and service
Time-Date	O	time & date of various message aspects
MMS-Obj-Hdr	O	user data length and type
MMS-Ext-Hdr	O	service or message specific attributes
Segmented-Info	O	segments of a network layer message
Repeat-Indicator	O	repetition of a particular IE
SECONDARY PART		
MMS-Ext-Hdr	O	service or message specific attributes
Repeat-Indicator	O	repetition of a particular IE
User Data	O	this IE contains the User Data

6.3.2.7 MMS-STATUS procedures

The MMS STATUS procedures are intended to provide the user application with a means to monitor the status of the MCE, with particular emphasis on the status of messages. The {MMS-STATUS} message is used to request status information, typically but not exclusively from the user application to the MCE, whereas the status reply message {MMS-STATUS-RPY} is used for notification of status information, typically but not exclusively to the user application by the MCE. The content of the {MMS-STATUS} message is defined in the table A.12 and {MMS-STATUS-RPY} in the table A.13.

Upon receipt of M_MMS_STATUS-req primitive from the higher-layer entity the MMS initiating entity shall send the {MMS-STATUS} message to the receiving MMS entity. When a MMS entity receives a {MMS-STATUS} message it shall issue a M_MMS_STATUS-ind to the upper layer. Upon receipt of M_MMS_STATUS_RPY-req the receiving MMS entity shall send a {MMS-STATUS-RPY} message. Upon receipt of the {MMS-STATUS-RPY} from the receiving MMS entity the initiating MMS entity shall issue a M_MMS_STATUS_RPY-ind primitive to the higher layer entity.

The higher layer entity may also issue a M_MMS_STATUS_RPY-req primitive at any time in response to a request for a reply from the EE coded in the "reply request" field of the <<MMS-GENERIC-HEADER>> element in an {MMS-SEND} message.

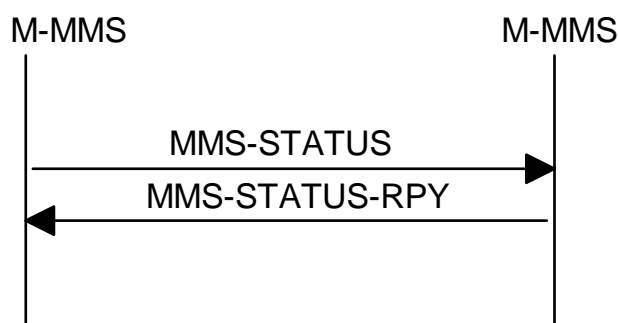


Figure 6.14: MMS Status procedure options

6.3.2.7.1 {MMS-STATUS} message contents

Table 6.12

{MMS-STATUS} IEs	Syntax status	Description
PRIMARY PART		
MMS-Generic-Hdr	M	MMS command and service
Called-Party-Number	O	EE address
Called-Party-Subaddr	O	EE subaddress
Calling-Party-Number	O	initiating entity (PP or MCE) address
Time-Date	O	time & date of various message aspects
MMS-Obj-Hdr	O	user data length and type
MMS-Ext-Hdr	O	service or message specific attributes
Segmented-Info	O	segments of a network layer message
Repeat-Indicator	O	repetition of a particular IE
SECONDARY PART		
MMS-Ext-Hdr	O	service or message specific attributes
Repeat-Indicator	O	repetition of a particular IE
User Data	O	this IE contains the User Data

6.3.2.7.2 {MMS-STATUS-RPY} message contents

Table 6.13

{MMS-STATUS-RPY} IEs	Syntax status	Description
PRIMARY PART		
MMS-Generic-Hdr	M	MMS command and service
Time-Date	O	time & date of various message aspects
MMS-Obj-Hdr	O	user data length and type
MMS-Ext-Hdr	O	service or message specific attributes
Segmented-Info	O	segments of a network layer message
Repeat-Indicator	O	repetition of a particular IE
SECONDARY PART		
MMS-Ext-Hdr	O	service or message specific attributes
Repeat-Indicator	O	repetition of a particular IE
User Data	O	this IE contains the User Data

6.3.2.8 MMS-ESC-CMD procedure

The MMS ESC(ape) C(om)M(an)D procedure is intended to enable the user application to control proprietary functions in the MCE. The control reply (MMS-ESC-CMD-RPY) is an optional reply requested in the MMS-ESC-CMD message. The content of the {MMS-ESC-CMD} message is defined in the table A.14 and {MMS-ESC-CMD-RPY} in the table A.15.

Upon receipt of M_MMS_ESC_CMD-req primitive from the higher-layer entity MMS entity shall send the {MMS-ESC-CMD} message to the receiving MMS entity. When a MMS entity receives a {MMS-ESC-CMD} message it shall issue a M_MMS_ESC_CMD-ind to the upper layer. Upon receipt of M_MMS_ESC_CMD_RPY-req the MMS entity shall issue a {MMS-ESC-CMD-RPY} message. Upon receipt of the {MMS-ESC-CMD-RPY} the initiating MMS entity shall issue a M_MMS_ESC_CMD_RPY-ind primitive to the higher-layer entity.

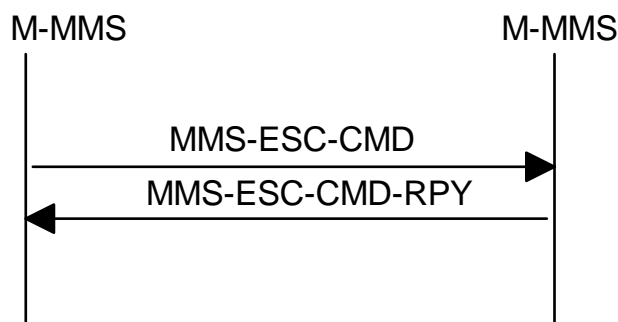


Figure 6.15: MMS Command procedure options

6.3.2.8.1 {MMS-ESC-CMD} message contents

Table 6.14

{MMS-ESC-CMD} IEs	Syntax status	Description
PRIMARY PART		
MMS-Generic-Hdr	M	MMS command and service
Called-Party-Number	O	EE address
Called-Party-Subaddr	O	EE subaddress
Calling-Party-Number	O	initiating entity (PP or MCE) address
Time-Date	O	time & date of various message aspects
MMS-Obj-Hdr	O	user data length and type
MMS-Ext-Hdr	O	service or message specific attributes
Segmented-Info	O	segments of a network layer message
Repeat-Indicator	O	repetition of a particular IE
SECONDARY PART		
MMS-Ext-Hdr	O	service or message specific attributes
Repeat-Indicator	O	repetition of a particular IE
User Data	O	this IE contains the User Data

6.3.2.8.2 {MMS-ESC-CMD-RPY} message contents

Table 6.15

{MMS-ESC-CMD} IEs	Syntax status	Description
PRIMARY PART		
MMS-Generic-Hdr	M	MMS command and service
Time-Date	O	time & date of various message aspects
MMS-OBJ-HDR	O	User Data length and type
MMS-Ext-Hdr	O	service or message specific attributes
Segmented-Info	O	segments of a network layer message
Repeat-Indicator	O	repetition of a particular IE
SECONDARY PART		
MMS-Ext-Hdr	O	service or message specific attributes
Repeat-Indicator	O	repetition of a particular IE
User Data	O	this IE contains the User Data

6.3.2.8.3 Generic interworking conventions for the {MMS-ESC-CMD} command and reply

Interworking conventions for the {MMS-ESC-CMD} command and reply messages are outside the scope of the present document.

6.3.2.9 Procedures for the use of the MMS-message identifier

The "MMS-message identifier" field is set to a value defined by the higher-layer application according to MMS coding rules, and is intended to be used for:

- linking of all parts of one MMS message which are transmitted along different channels by the underlying DECT transport;
- application-layer association between MMS initiating commands and replies.

One MMS command may cause the higher-layer entity to generate more than one reply, but no more than three replies shall be awaiting completion of transmission at once.

The "MMS-message identifier" is coded as shown in annex B, and consists of three subfields: initiate/reply, action ID, and reply sequence number.

The initiate/reply bit shall be set to 0 by the entity that originated the initiating command, and shall be set to 1 by the entity responsible for the reply.

The Action ID shall be set to a locally unique value by the entity that originated the initiating command, and shall be echoed by the entity responsible for the reply.

The reply sequence number shall be set to 00 by the entity that originated the initiating command, and shall be set by the entity responsible for the reply to 00, 01 and 10 cyclically in successive replies to a command defined by a specific Action ID. It shall be set to 11 in the last reply associated with a specific Action ID where the replying entity has this knowledge, otherwise this value shall not be used. Receipt of this value shall be understood by the issuer of the Action ID to mean that the transaction associated with this value is now completed and that the value may now therefore be freely reused. Management of the Action ID if this value is not received is a local management matter.

6.3.2.10 Multi-part message procedures

The multi-part message procedures shall make use of the "multi-part parent message ID" field in the <<MMS-Obj-Hdr>> IE.

The "Multipart Parent Message ID" field is set to a value defined by the higher-layer application, and is intended to be used for application-layer association between different MMS commands and/or replies related to the same multi-part message.

When a higher-layer entity initiates a procedure relating to a multi-part message, it shall select a value for the "Multipart Parent Message ID" and shall use this value in all subsequent commands (including replies) relating to this message.

6.3.2.10.1 Multi-part send procedures

The sending of a multi-part message may optionally commence with a MMS-SEND-REQ procedure, containing the "multi-part parent message ID" and specifying in the <<MMS-Obj-Hdr>> the attributes of the first part of the message. In this case the higher-layer entity shall only proceed to send a multi-part message if in the corresponding {MMS-SEND-RPY} message the <<MMS-Generic-Hdr>> carries the "Command Outcome" field coded to "space allocated". Other codings of this field shall cause the higher-layer entity to not send the message in its proposed dimension. In this case the higher-layer entity may reissue the M_MMS_SEND_REQ-req primitive, at a later time, or with a smaller number of parts or a different data type.

If the higher-layer entity is entitled to proceed with the transmission, each part of the multi-part message shall be sent in a separate {MMS-SEND} message. In the case that the attributes of an object part are different from those of the last part transmitted, higher-layer entity may issue a M_MMS_SEND_REQ-req primitive, using the same multi-part parent message ID as before and in this case shall await a favourable outcome before proceeding to the transmission of the new part.

When the higher-layer entity has completed the transmission of a multi-part message, it shall send a final M_MMS_SEND-req primitive with the <<MMS-Obj-Hdr>> "Src Data Type" field set to "End of Multi-Part message".

6.3.2.10.2 Multi-part retrieve procedures

If a higher layer entity receives a M_MMS_RETRIEVE-req primitive, which refers to a multi-part message, it shall always respond with a M_MMS_RETRIEVE_RPY-req primitive, containing the multi-part parent message ID and the <<MMS-Obj-Hdr>> "Src Data Type" set to "Multi-Part Message". No user data shall be appended to this message. It shall then proceed to transmit the multi-part message to the requesting entity, using the multi-part send procedures and the multi-part parent message ID set to the same value as in the {MMS-RETRIEVE-RPY} message.

6.3.2.11 Unsupported MMS command and IE compatibility procedures

6.3.2.11.1 Unsupported MMS commands procedure

All M-MMS entities shall be capable of receiving all of the MMS commands and responding with the appropriate {MMS-xxxx-RPY} message. If a message is not supported or not supported with the particular Information Elements (IEs) or IE parameters sent with the command then, only if either an EE or MCE reply was requested, the receiving entity shall respond with the appropriate {MMS-xxxx-RPY} message including only the <<MMS-GENERIC-HDR>> IE and indicating:

- Command Outcome (octet 6) = Command (and/or Ext. Command) not supported; or
- Command Outcome (octet 6) = Unable to carry out Command due to lack of IE support.

The MMS message identifier (and Extended MMS message identifier) shall indicate the same "Action ID" as the received command. The service type and Service Sub-type codings in the reply shall be identical to those in the received command.

6.3.2.11.2 Unsupported Information elements procedure

This is an optional procedure. If supported it shall be implemented as follows:

This procedure applies if an M-MMS entity receives a MMS command which it supports in general, but which included Information Elements (IEs) which it does not support for this particular command. In this case the receiving entity will determine whether it can carry out the command or not and respond appropriately (if requested to do so) indicating the "Command Outcome" in octet 6 of the <<MMS-GENERIC-HDR>> IE. It may then optionally include in this response the "Command Outcome - IE support" codings (octets 6a and 6b) to indicate which IEs of the received command it does not support (within the context of that command only).

6.4 MMSP information elements

Since the C-MMSP has no inherent messages or information elements, this annex describes only the M-MMSP information elements.

6.4.1 Summary of M-MMSP information elements

The definitions of the M-MMSP elements have been intentionally aligned with the mechanism onto which they are mapped, which is the DECT network layer. Therefore, the definitions of some of the information elements are to be found in the DECT base standard, according to the mappings given in annex B.

In the case of MMS-specific information elements however, the codings themselves are contained in this profile, and may be found directly in annex B.

Table 6.16: Summary of M-MMSP information elements

	Ref.
PRIMARY PART	
MMS-Generic-Hdr	A.1.1
Called-Party-Number	A.4.2
Called-Party-Subaddr	A.4.2
Calling-Party-Number	A.4.2
Time-Date	A.4.2
MMS-Obj-Hdr	A.1.2
MMS-Ext-Hdr	A.1.3
Segmented-Info	A.4.2
Repeat-Indicator	A.4.2
SECONDARY PART	
MMS-Ext-Hdr	A.1.3
Repeat-Indicator	A.4.2
User Data	A.4.2

6.5 Parameters of M-MMSP service primitives

The parameters of the M-MMSP service primitives are the means by which the higher layer entity can effectively use the MMS. In practice, these parameters are coded into fields of the M-MMSP information elements listed in clause A.2. The structure of these information elements is identical to the codings in the underlying DECT layer, which are therefore used as the master source for the details of the value codings.

6.5.1 M_MMS_SEND- {req, ind}

Table 6.17

Parameter	Allowed values (ref.)	Status
Reply Request	A.1.1	M
MMS-Message Identifier	A.1.1	M
MMS-Message Identifier Extension	A.1.1	O
Service type	A.1.1	M
Service Sub-type	A.1.1	O
Command Outcome	A.1.1	X
User Data Length	A.1.2	M
Source Data Category	A.1.2	M
Destination Data Category	A.1.2	O
Source Data Transfer Category	A.1.2	M
Destination Data Transfer Category	A.1.2	O
Source Data Transfer Encoding	A.1.2	M
Destination Data Transfer Encoding	A.1.2	O
Source Data Type	A.1.2	O
Destination Data Type	A.1.2	O
Multipart Parent Message Identifier	A.1.2	O
Multipart Parent Message Identifier Extension	A.1.2	O
Called Party identity	A.4.2	O
Called Party subaddress	A.4.2	O
Calling Party identity	A.4.2	O
Time/date stamp	A.4.2	O
User Data	A.4.2	O

6.5.2 M_MMS_SEND_REQ- {req, ind}

Table 6.18

Parameter	Allowed values (ref.)	Status
Reply Request	A.1.1	M
MMS-Message Identifier	A.1.1	M
MMS-Message Identifier Extension	A.1.1	O
Service type	A.1.1	M
Service Sub-type	A.1.1	O
Command Outcome	A.1.1	X
User Data Length	A.1.2	M
Source Data Category	A.1.2	M
Destination Data Category	A.1.2	O
Source Data Transfer Category	A.1.2	M
Destination Data Transfer Category	A.1.2	O
Source Data Transfer Encoding	A.1.2	M
Destination Data Transfer Encoding	A.1.2	O
Source Data Type	A.1.2	O
Destination Data Type	A.1.2	O
Multipart Parent Message Identifier	A.1.2	O
Multipart Parent Message Identifier Extension	A.1.2	O
Called Party identity	A.4.2	O
Called Party subaddress	A.4.2	O
Calling Party identity	A.4.2	O
Time/date stamp	A.4.2	O

6.5.3 M_MMS_SEND_RPY- {req, ind}

Table 6.19

Parameter	Allowed values (ref.)	Status
Reply Request	A.1.1	M
MMS-Message Identifier	A.1.1	M
MMS-Message Identifier Extension	A.1.1	O
Service type	A.1.1	X
Service Sub-type	A.1.1	X
Command Outcome	A.1.1	M
User Data Length	A.1.2	X
Source Data Category	A.1.2	O
Destination Data Category	A.1.2	O
Source Data Transfer Category	A.1.2	O
Destination Data Transfer Category	A.1.2	O
Source Data Transfer Encoding	A.1.2	O
Destination Data Transfer Encoding	A.1.2	O
Source Data Type	A.1.2	O
Destination Data Type	A.1.2	O
Multipart Parent Message Identifier	A.1.2	O
Multipart Parent Message Identifier Extension	A.1.2	O
Called Party identity	A.4.2	X
Called Party subaddress	A.4.2	X
Calling Party identity	A.4.2	X
Time/date stamp	A.4.2	O

6.5.4 M_MMS_RETRIEVE- {req, ind}

Table 6.20

Parameter	Allowed values (ref.)	Status
Reply Request	A.1.1	M
MMS-Message Identifier	A.1.1	M
MMS-Message Identifier Extension	A.1.1	O
Service type	A.1.1	M
Service Sub-type	A.1.1	O
Command Outcome	A.1.1	X
User Data Length	A.1.2	O
Source Data Category	A.1.2	O
Destination Data Category	A.1.2	X
Source Data Transfer Category	A.1.2	O
Destination Data Transfer Category	A.1.2	X
Source Data Transfer Encoding	A.1.2	O
Destination Data Transfer Encoding	A.1.2	X
Source Data Type	A.1.2	O
Destination Data Type	A.1.2	X
Multipart Parent Message Identifier	A.1.2	X
Multipart Parent Message Identifier Extension	A.1.2	X
Called Party identity	A.4.2	O
Called Party subaddress	A.4.2	O
Calling Party identity	A.4.2	O
Time/date stamp	A.4.2	O

6.5.5 M_MMS_RETRIEVE_RPY- {req, ind}

Table 6.21

Parameter	Allowed values (ref.)	Status
Reply Request	A.1.1	M
MMS-Message Identifier	A.1.1	M
MMS-Message Identifier Extension	A.1.1	O
Service type	A.1.1	X
Service Sub-type	A.1.1	X
Command Outcome	A.1.1	M
User Data Length	A.1.2	M
Source Data Category	A.1.2	M
Destination Data Category	A.1.2	O
Source Data Transfer Category	A.1.2	M
Destination Data Transfer Category	A.1.2	O
Source Data Transfer Encoding	A.1.2	M
Destination Data Transfer Encoding	A.1.2	O
Source Data Type	A.1.2	M
Destination Data Type	A.1.2	O
Multipart Parent Message Identifier	A.1.2	O
Multipart Parent Message Identifier Extension	A.1.2	O
Called Party identity	A.4.2	X
Called Party subaddress	A.4.2	X
Calling Party identity	A.4.2	X
Time/date stamp	A.4.2	O
User Data	A.4.2	O

6.5.6 M_MMS_EXT_CMD- {req, ind}

Table 6.22

Parameter	Allowed values (ref.)	Status
Reply Request	A.1.1	M
MMS-Message Identifier	A.1.1	M
MMS-Message Identifier Extension	A.1.1	O
Service type	A.1.1	O
Service Sub-type	A.1.1	O
Command Outcome	A.1.1	X
User Data Length	A.1.2	O
Source Data Category	A.1.2	O
Destination Data Category	A.1.2	X
Source Data Transfer Category	A.1.2	O
Destination Data Transfer Category	A.1.2	X
Source Data Transfer Encoding	A.1.2	O
Destination Data Transfer Encoding	A.1.2	X
Source Data Type	A.1.2	O
Destination Data Type	A.1.2	X
Multipart Parent Message Identifier	A.1.2	O
Multipart Parent Message Identifier Extension	A.1.2	O
Called Party identity	A.4.2	O
Called Party subaddress	A.4.2	O
Calling Party identity	A.4.2	O
Time/date stamp	A.4.2	O
User Data	A.4.2	O

6.5.7 M_MMS_EXT_CMD_RPY- {req, ind}

Table 6.23

Parameter	Allowed values (ref.)	Status
Reply Request	A.1.1	M
MMS-Message Identifier	A.1.1	M
MMS-Message Identifier Extension	A.1.1	O
Service type	A.1.1	X
Service Sub-type	A.1.1	X
Command Outcome	A.1.1	M
User Data Length	A.1.2	O
Source Data Category	A.1.2	O
Destination Data Category	A.1.2	X
Source Data Transfer Category	A.1.2	O
Destination Data Transfer Category	A.1.2	X
Source Data Transfer Encoding	A.1.2	O
Destination Data Transfer Encoding	A.1.2	X
Source Data Type	A.1.2	O
Destination Data Type	A.1.2	X
Multipart Parent Message Identifier	A.1.2	O
Multipart Parent Message Identifier Extension	A.1.2	O
Called Party identity	A.4.2	X
Called Party subaddress	A.4.2	X
Calling Party identity	A.4.2	X
Time/date stamp	A.4.2	O
User Data	A.4.2	O

6.5.8 M_MMS_STATUS- {req, ind}

Table 6.24

Parameter	Allowed values (ref.)	Status
Reply Request	A.1.1	M
MMS-Message Identifier	A.1.1	M
MMS-Message Identifier Extension	A.1.1	O
Service type	A.1.1	O
Service Sub-type	A.1.1	O
Command Outcome	A.1.1	O
User Data Length	A.1.2	O
Source Data Category	A.1.2	O
Destination Data Category	A.1.2	X
Source Data Transfer Category	A.1.2	O
Destination Data Transfer Category	A.1.2	X
Source Data Transfer Encoding	A.1.2	O
Destination Data Transfer Encoding	A.1.2	X
Source Data Type	A.1.2	O
Destination Data Type	A.1.2	X
Multipart Parent Message Identifier	A.1.2	O
Multipart Parent Message Identifier Extension	A.1.2	O
Called Party identity	A.4.2	O
Called Party subaddress	A.4.2	O
Calling Party identity	A.4.2	O
Time/date stamp	A.4.2	O
User Data	A.4.2	O

6.5.9 M_MMS_STATUS_RPY- {req, ind}

Table 6.25

Parameter	Allowed values (ref.)	Status
Reply Request	A.1.1	M
MMS-Message Identifier	A.1.1	M
MMS-Message Identifier Extension	A.1.1	O
Service type	A.1.1	X
Service Sub-type	A.1.1	X
Command Outcome	A.1.1	M
User Data Length	A.1.2	O
Source Data Category	A.1.2	O
Destination Data Category	A.1.2	X
Source Data Transfer Category	A.1.2	O
Destination Data Transfer Category	A.1.2	X
Source Data Transfer Encoding	A.1.2	O
Destination Data Transfer Encoding	A.1.2	X
Source Data Type	A.1.2	O
Destination Data Type	A.1.2	X
Multipart Parent Message Identifier	A.1.2	O
Multipart Parent Message Identifier Extension	A.1.2	O
Called Party identity	A.4.2	X
Called Party subaddress	A.4.2	X
Calling Party identity	A.4.2	X
Time/date stamp	A.4.2	O
User Data	A.4.2	O

6.5.10 M_MMS_ESC_CMD- {req, ind}

Table 6.26

Parameter	Allowed values (ref.)	Status
Reply Request	A.1.1	M
MMS-Message Identifier	A.1.1	M
MMS-Message Identifier Extension	A.1.1	O
Service type	A.1.1	O
Service Sub-type	A.1.1	O
Command Outcome	A.1.1	X
User Data Length	A.1.2	O
Source Data Category	A.1.2	O
Destination Data Category	A.1.2	O
Source Data Transfer Category	A.1.2	O
Destination Data Transfer Category	A.1.2	O
Source Data Transfer Encoding	A.1.2	O
Destination Data Transfer Encoding	A.1.2	O
Source Data Type	A.1.2	O
Destination Data Type	A.1.2	O
Multipart Parent Message Identifier	A.1.2	O
Multipart Parent Message Identifier Extension	A.1.2	O
Called Party identity	A.4.2	O
Called Party subaddress	A.4.2	O
Calling Party identity	A.4.2	O
Time/date stamp	A.4.2	O
User Data	A.4.2	O

6.5.11 M_MMS_ESC_CMD_RPY- {req, ind}

Table 6.27

Parameter	Allowed values (ref.)	Status
Reply Request	A.1.1	M
MMS-Message Identifier	A.1.1	M
MMS-Message Identifier Extension	A.1.1	O
Service type	A.1.1	O
Service Sub-type	A.1.1	O
Command Outcome	A.1.1	M
User Data Length	A.1.2	O
Source Data Category	A.1.2	O
Destination Data Category	A.1.2	O
Source Data Transfer Category	A.1.2	O
Destination Data Transfer Category	A.1.2	O
Source Data Transfer Encoding	A.1.2	O
Destination Data Transfer Encoding	A.1.2	O
Source Data Type	A.1.2	O
Destination Data Type	A.1.2	O
Multipart Parent Message Identifier	A.1.2	O
Multipart Parent Message Identifier Extension	A.1.2	O
Called Party identity	A.4.2	X
Called Party subaddress	A.4.2	X
Calling Party identity	A.4.2	X
Time/date stamp	A.4.2	O
User Data	A.4.2	O

7 Short Message Service (SMS)

7.1 Feature and service definitions

7.1.1 Application features

Incoming message storage [A.1]: ability to store incoming SMS message(s).

Message interworking [A.2]: ability to interwork SMS-RP message and primitives.

7.1.2 MMS features

Outgoing message transfer (S.1): ability to transfer a SMS message, across the air interface in the direction from PP to FP.

Incoming message transfer (S.2): ability to transfer a SMS message, across the air interface in the direction from FP to PP.

7.1.3 NWK features

Outgoing messaging call (N.1): outgoing call for an SMS operation.

Incoming messaging call (N.2): incoming call for an SMS operation.

7.1.4 DLC services

LAPC class B service and Lc [D.1]: multiple frame acknowledged C-plane data link service providing a single data link between one FT and one PT. The higher layer information is segmented (if necessary) and transmitted in numbered frames. The Lc provides frame delimiting, transparency and frame synchronization.

7.2 General requirements

7.2.1 Reference configurations

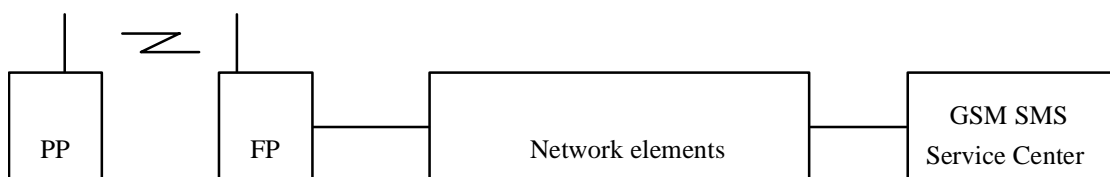


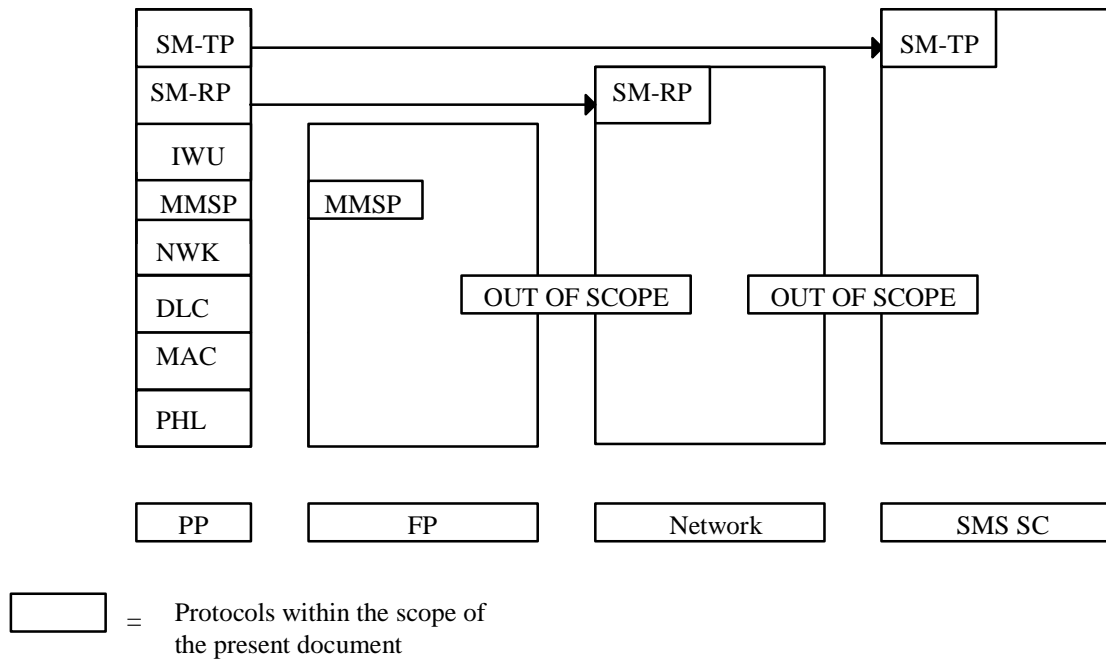
Figure 7.1: Reference configuration

7.2.2 Protocol architecture

Figure 7.2 provides an overview of the protocol architecture. The figure shows that the following protocol layers are within scope of the present document:

- the DECT protocol layers (PHL up to NWK) as specified in EN 300 175 parts 1 [1] to 8 [8];
- the DECT Multimedia Messaging Service Protocol (MMSP) layer.

The MMSP, which is specified in clause 7 of the present document, is described as a "virtual" protocol layer, since no real protocol behaviour is defined. MMSP only specifies a series of messages which are actually transferred via a set of dedicated NWK-CC IEs. In this clause MMSP is handled as a normal protocol layer.



NOTE: The figure shows that the SM-RP protocol may be located within the network. However, this is just one of the possible locations.

Figure 7.2: Protocol stack for SMS

Although in principle the SM-TP and SM-RP protocols are outside the scope of the present document, the assumption is that these protocols are used as defined in the GSM standards. This assumption has implications for the present document; the MMS shall support the transfer of GSM SMS RP messages.

7.3 Interoperability requirements

7.3.1 Application features

Table 7.1: Application features status

Feature supported					
Item no.	Name of feature	Ref.	Status		
			PT	R/B	P
A.1	Incoming message storage	7.3.7	M	N/A	N/A
A.2	Message interworking	7.3.7	M	M	M

7.3.2 MMS features

MMS shall support a max. SDU size of 254 octets.

NOTE: The above length can be supported by using the existing <<IWU to IWU>>. MMS should support the transfer of encapsulated GSM RP messages. Since GSM 4.11 is ambiguous about the maximum length (values of 255, 248 and 251 are stated), it does not seem justified to extend the definition of <<IWU to IWU>>.

Table 7.2: MMS features status

Feature supported					
Item no.	Name of feature	Ref.	Status		
			PT	FT	
				R/B	P
S.1	Outgoing message transfer	7.3.8	M	M	M
S.2	Incoming message transfer	7.3.8	M	M	M

7.3.3 NWK features

In order to simultaneously support incoming and outgoing SMS message transfer and speech, NWK shall simultaneously support at least two CC instances for messaging calls and one CC instance for speech.

Table 7.3: NWK features status

Feature supported					
Item no.	Name of feature	Ref.	Status		
			PT	FT	
				R/B	P
N.1	Outgoing messaging call	7.3.9	M	M	M
N.2	Incoming messaging call	7.3.9	M	M	M

7.3.4 DLC services

Table 7.4: DLC services status

Feature supported					
Item no.	Name of feature	Ref.	Status		
			PT	FT	
				R/B	P
D.1	LAPC class B service and Lc	7.3.10	O	O	O

7.3.5 MAC services

None.

NOTE: Only support of the Cs channel is required.

7.3.6 PHL services

None.

7.3.7 Application feature to procedure mapping

Table 7.5: MMS feature to procedure mapping

Feature	Procedure	GAP Ref. [9]	SMS Ref.	PT	FT	
					R/B	P
A.1 Incoming message storage				M	N/A	N/A
	Incoming message storage		7.4.1	M	N/A	N/A
A.2 Message interworking				M	M	M
	Message encapsulation		7.4.2	M	M	M
	General interworking requirements		7.4.3	M	M	M
	Message/primitive interworking		7.4.4	M	M	M

7.3.8 MMS feature to procedure mapping

Table 7.6: MMS feature to procedure mapping

Feature	Procedure	GAP Ref. [9]	SMS Ref.	PT	FT	
					R/B	P
S.1 Outgoing message transfer				M	M	M
	Message send procedure		7.4.1	M	M	M
S.2 Incoming message transfer				M	M	M
	Message send procedure		7.4.1	M	M	M

7.3.9 NWK feature to procedure mapping

Table 7.7: NWK feature to procedure mapping

Feature	Procedure	GAP Ref. [9]	SMS Ref.	PT	FT	
					R/B	P
N.1 Outgoing messaging call				M	M	M
	Outgoing messaging call request		7.6.2	M	M	M
	Outgoing message call connect		7.6.3	M	M	M
	Message transfer		7.6.7	M	M	M
	Normal call release	8.7		M	M	M
	Abnormal call release	8.8		M	M	M
	Partial release	8.9		O	O	O
N.2 Incoming messaging call				M	M	M
	Incoming messaging call request		7.6.5	M	M	M
	Incoming messaging call connection		7.6.6	M	M	M
	Message transfer		7.6.7	M	M	M
	Normal call release	8.7		M	M	M
	Abnormal call release	8.8		M	M	M
	Partial release	8.9		O	O	O
	Terminal capability indication		7.6.8	M	M	M

NOTE: The present document does not include requirements concerning the support of external handover. Handover procedures are considered inappropriate since they require transfer of MMSP-state information and message information from Fixed Part 1 to Fixed Part 2 via the backbone network, which is regarded as too complicated. It is considered that retransmission of the SMS message provides a better solution.

7.3.10 DLC feature to procedure mapping

Table 7.8: DLC feature to procedure mapping

Feature	Procedure	GAP Ref. [9]	SMS Ref.	PT	FT	
					R/B	P
D.1 class B service and Lc				O	O	O
	Class B link establishment		7.7.1	M	M	M
	Class B multi frame operation		7.7.2	M	M	M
	Class B link release		7.7.3	M	M	M
	Class B link suspension and resumption		7.7.4	M	M	M
	Class B link re- establishment		7.7.5	M	M	M

7.4 Application procedures

7.4.1 Incoming message storage

The PP shall be able to storage at least one incoming SMS message.

NOTE: The PP is not mandated to support a SIM or DAM card.

7.4.2 Message encapsulation

The PP- & FP IWU shall encapsulate complete SM-RP messages, without additions or modifications, within one or more <<IWU-TO-IWU>> IE, i.e. SM-RP octet 1 shall be the 1st octet of the <IWU-TO-IWU INFORMATION> within the first <<IWU-TO-IWU>> IE and so on.

NOTE: The GSM SMS-RP messages are carried transparently across the DECT air interface; there is no need to convert the information contained within these messages e.g. from GSM to the DECT character set.

7.4.3 General interworking requirements

7.4.3.1 Mapping of SMS message transfers onto CC- transactions

Both the FP and the PP shall support the simultaneous transfer of an incoming and an outgoing message, even when a speech call is ongoing in parallel.

In case SMS message transfer is performed while a speech call is going on involving the same PP, the SMS message transfer shall apply an separate/independent CC instance, with a different transaction identifier.

Likewise, if both incoming and outgoing SMS messages are transferred simultaneously, the incoming SMS messages shall be handled by a different CC-transaction than the outgoing SMS messages.

7.4.3.2 Authentication and ciphering

Before sending an SMS message over air interface, the ciphering procedure shall be completed successfully. If ciphering keys have not yet been allocated, the authentication procedure shall be performed first. The ciphering and authentication procedures shall be performed as defined in GAP [9] (thus DECT standard ciphering & authentication; not GSM).

7.4.4 Message/primitive interworking

Since they do not affect interworking, there is no need to constrain the implementation of the IWF and/MMS functionality by defining requirements concerning the handling of local primitives. However, an informative annex is provided to illustrate possible interactions between the SMS-RP, IWU, MMS and NWK layers (see annex B).

Although in normal cases the PP application initiates release of the SMS messaging related connection(s), the FP application is also allowed to initiate release. The PP and/or the FP application should at least initiate release of the connection in the following error cases:

- ciphering failure;
- an error in the backbone network to which the FP is connected.

The IWU should include an appropriate release reason, the value of which may depend on interworking rules specified in other standards.

7.5 MMS procedures

NOTE: Since the MMSP procedures are completely symmetrical, they are not specified per direction as done for other layers.

7.5.1 Messaging send procedure

The procedure shall be performed as defined in subclause 7.3.2.2 of the present document. This subclause specifies the minimum requirements with regard to the present document.

Figure 7.3 provides an overview of the possible sequences MMS-messages for the messaging send procedure. The same sequence applies in both directions.

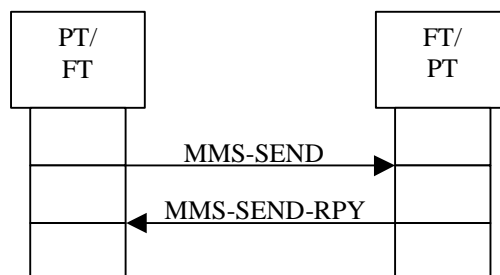


Figure 7.3: Message send

The information elements listed in the following message specifications are all mapped onto the equivalent network layer information elements.

Table 7.9: Values used within the {MMS-SEND} message

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<MMS-Generic-Hdr>>			
	<MMS command type>	00000B	MMS-SEND
	<Reply requested>	00B	No reply requested
	<MMS message identifier - I/R>	0B	Initiator
	<MMS message identifier - Rply seq>	00B	Value always used for initial request
	<MMS message identifier - Action ID part 1>	All	In case more than one SMS messages is transferred simultaneously concerning one PP, the action ID is used to distinguish them. Always the lowest possible available number shall be used
	<Service type>	0010011B	GSM SMS
<<MMS-Obj-Hdr>>	<Reserv>	00B	Reserved
	<Length description>	00B	User data length specified
	<Number of length octets>	000B	1 octet
	<User data length, octet 1>	1 - 254	Number of user data octets
	<Source user data category>	11B	Other user data
	<Source user data transfer encoding>	00000B	No transfer encoding
	<Source user data type>	010010B	Encapsulated: GSM SMS
<<IWU- to IWU>>	<length>	4 - 55	Reflects the length of the present information element
	<S/R>	1B	Transmission of message
	<Protocol discriminator>	010100B	MMS user data (LRMSprofile)
	<<WU to IWU information>>	All	User data; the actual text message
NOTE: In order to comply with clause 6.5.6 table 6.22, <MMS message identifier>, <Service type> and <User data length> are included even though they are not essential considering that some information is carried within the upper layer GSM-SMS protocols, while other information could be handled by defining profile specific default values.			

Table 7.10: Values used within the {MMS-SEND-RPY} message

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<MMS-Generic-Hdr>>			
	<MMS command type>	00001B	MMS-SEND-RPY; reply to MMS-SEND
	<Reply requested>	00B	No reply requested
	<MMS message identifier - I/R>	1	Replying entity
	<MMS message identifier - Rply seq>	11	There is always only one reply to a request (New SMS messages are send with a different action ID)
	<MMS message identifier - Action ID part 1>	All	Same value as used in the MMS-SEND
	<Service type>	0010011	GSM-SMS
	<Command outcome>	All	
NOTE 1: In order to comply with subclause 6.5.8 table 6.24, <MMS message identifier> and <Command outcome> are included even though they are not essential considering that this information is also carried within the upper layer GSM-SMS protocols.			
NOTE 2: In case a side wishes to transfer more than one message it need not apply a different CC-instance for every message. However, the transfer of a new message should not be started before the completion of the transfer of the previous message. In case of acknowledged transfer, this implies that the new message should not be transferred prior to the reception of a MMS-SEND-RPY for the current message.			

7.6 NWK layer procedure descriptions

7.6.1 Summary of outgoing call messages, normal case

Figure 7.4 shows the sequence(s) of outgoing messaging call related messages that shall be supported.

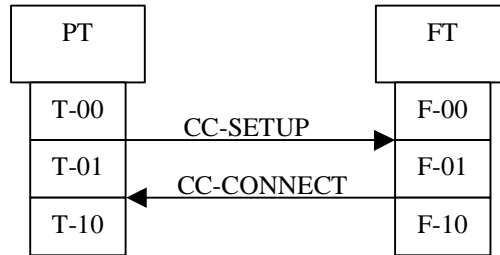


Figure 7.4: Outgoing messaging call scenario

7.6.2 Outgoing messaging call request

The procedure shall be performed as defined in subclause 9.3.1.1 of EN 300 175-5 [5]. The minimum requirements with regard to the present document are as defined in subclause 8.2 of EN 300 444 [9], with the additions/modifications as specified in this subclause.

The PP shall only initiate the outgoing messaging call request procedure towards an FP that has indicated support of LRMS by means of extended higher layer capability broadcast bit a43.

Table 7.11: Values used within the {CC-SETUP} message

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<Basic service>>			
	<Call class>	4	Message call setup
	<Basic service>	15	Other
<<IWU attributes>>	<Coding standard>	1	Profile defined
	<Profile>	3	LRMS profile
	<Negotiation indicator>	0	Negotiation not possible
	<Profile subtype>	0	SMS
<<Connection attributes>>	<Symmetry>	1	Symmetric connection
	<Connection identity>	0	Unknown/not applicable
	<Target bearers>	0	None

In case the FP receives a request for a not supported messaging service, indicated by a <Profile subtype> value other than SMS, it shall reject the messaging call request using the procedure defined in EN 300 444 [9], subclause 8.2.2.3 with the additions/modifications as specified in the following.

Table 7.12: Values used within the {CC-RELEASE-COM} message

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<Release reason>>			
	<Reason reason code>	6	Service not implemented

7.6.3 Outgoing messaging call connect

The procedure shall be performed as defined in subclause 9.3.1.8 of EN 300 175-5 [5]. The minimum requirements with regard to the present document are as defined in subclause 8.16 of EN 300 444 [9], with the additions/modifications as specified in this subclause.

U-plane connection is not applicable, because messaging calls do not require a U-plane service.

7.6.4 Summary of incoming call messages, normal case

Figure 7.5 shows the sequence(s) of incoming messaging call related messages that shall be supported.

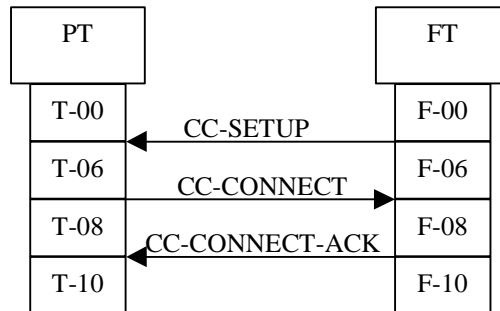


Figure 7.5: Incoming messaging call scenario

7.6.5 Incoming messaging call request

The procedure shall be performed as defined in subclause 9.3.2.1 of EN 300 175-5 [5]. The minimum requirements with regard to the present document are as defined in subclause 8.12 of EN 300 444 [9], with the additions/modifications as specified in this subclause.

The FP shall only initiate the outgoing messaging call request procedure towards a PP that has indicated support of an LRMS by means of the terminal capability indication procedure.

Table 7.13: Values used within the {CC-SETUP} message

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<Basic service>>			
	<Call class>	4	Message call setup
	<Basic service>	15	Other
<<IWU attributes>>			
	<Coding standard>	1	Profile defined
	<Profile>	3	LRMS profile
	<Negotiation indicator>	0	Negotiation not possible
	<Profile subtype>	0	SMS
<<Connection attributes>>			
	<Symmetry>	1	Symmetric connection
	<Connection identity>	0	Unknown/not applicable
	<Target bearers>	0	None

In case the PP receives a request for a not supported messaging service, indicated by a <Profile subtype> value other than SMS, it shall reject the messaging call request using the procedure defined in EN 300 444 [9], subclause 8.12.2.2 with the additions/modifications as specified in the following.

Table 7.14: Values used within the {CC-RELEASE-COM} message

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<Release reason>>			
	<Reason reason code>	6	Service not implemented

7.6.6 Incoming messaging call connect

The procedure shall be performed as defined in subclause 9.3.2.8 of EN 300 175-5 [5]. The minimum requirements with regard to the present document are as defined in subclause 8.12 of EN 300 444 [9], with the additions/modifications as specified in this subclause.

The call connection procedure shall be supported in state T-06/F-06. Moreover, since messaging calls do not apply a U-plane, U-plane connection shall not be performed.

NOTE: This differs from GAP, which requires support of call connection in T-07/F-07 only.

7.6.7 Message transfer

The procedure shall be performed as defined in subclause 9.4 of EN 300 175-5 [5]. The minimum requirements with regard to the present document are as specified in this subclause.

If required, the sending CC shall apply segmentation using the <<segmented info>> as specified the present document. The receiving CC shall reassemble the segmented frames.

NOTE: Segmentation is required for messages exceeding 47 characters (63 - 2 [message header] - 5 [mms-gen-hdr] - 6 [mms-obj-hdr] - 4 [segmented info] - 3 [iwu to iwu]). Each subsequent segmented message contains up to 54 octets (63 - 2 [message header] - 4 [segmented info] - 3 [iwu to iwu]).

Figure 7.6 shows the sequence of message transfer call related messages.

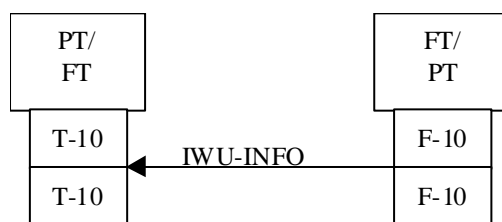


Figure 7.6: Message transfer scenario

Table 7.15: Values used within the {IWU-INFO} message, send

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<MMS-Generic-Hdr>>			As defined for MMS-SEND in subclause 7.5.1
<<MMS-Obj-Hdr>>			As defined for MMS-SEND in subclause 7.5.1
<<IWU - to IWU>>			As defined for MMS-SEND in subclause 7.5.1
<<Segmented info>>	<F>	0/1	Subsequent/First segment
	<Number of segments remaining>	0 - 127	Bit 8 is used for the F-bit
	<Segmented element type>	1110111B	<<IWU to IWU>>
NOTE: The assumption is that the F-bit within <<segmented info>>, which seems to have disappeared in a previous edition, possibly due to a general check on the use of octet extension is re-allocated to bit 8. This leaves way for a 7 bit <Number of segments remaining>, which is required to support the desired message lengths.			

Table 7.16: Values used within the {IWU-INFO} message, reply

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<MMS-Generic-Hdr>>			As defined for MMS-SEND-RPY in subclause 7.5.1
NOTE: Please note that the reply message does not contain user data. As illustrated in the annex, the SMS RP-ACK message is transferred within a separate send message in the reverse direction.			

7.6.8 Terminal capability indication

The procedure shall be performed as defined in subclauses 13.4.1 and 13.5.1 of EN 300 175-5 [5]. The minimum requirements with regard to the present document are as defined in subclause 8.17 of EN 300 444 [9], with the additions/modifications as specified in this subclause.

Table 7.17: Values used within the <<TERMINAL CAPABILITY>> information element

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<Terminal capability>>			
	<Profile indicator>	xx1xx11	Indicates that LRMS is supported. Further details about the supported service are exchanged during messaging call setup

7.7 DLC layer procedures

7.7.1 Class B link establishment

The procedure shall be performed as defined in subclauses 9.2.2.2 and 9.2.4 of EN 300 175-4 [4]. The following text together with the associated subclauses define the mandatory requirements with regard to the present document.

If, class B acknowledged transfer is requested but not supported (class B acknowledged transfer is not required to be supported for GAP [9]) by the receiving side, the I_frame requesting class B operation shall be treated as though it was a class A frame, see EN 300 175-4 [4], subclauses 9.2.4.3.1 b and 9.2.4.3.2 b.

During establishment of class B multiple frame operation, the maximum number of outstanding I-frames (the window size) shall be set to "1" for both directions (see subclause 9.2.4.1 of EN 300 175-4 [4]).

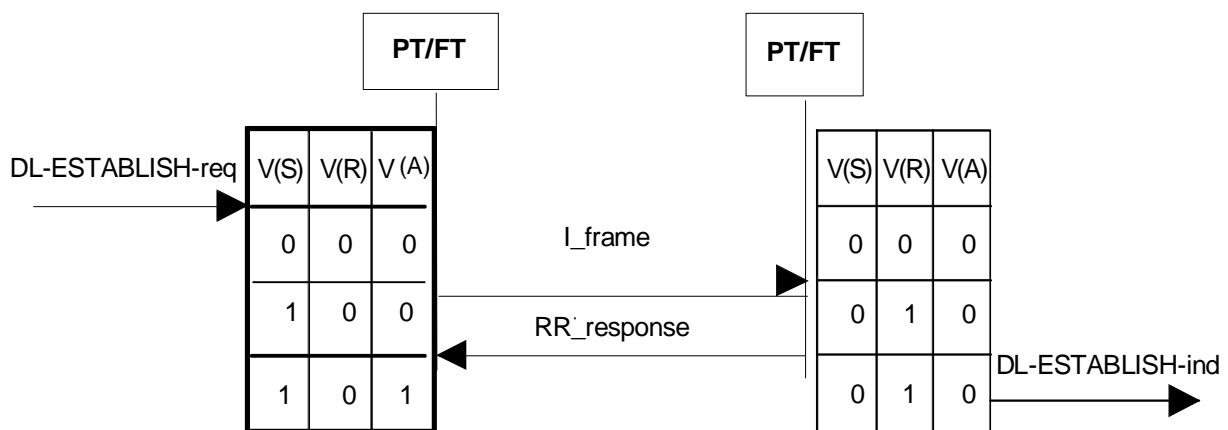


Figure 7.7: Class B link establishment. The same sequence applies in both directions

Table 7.18: Values used within the I-frame during class B link establishment

Field	Parameter within the field	Standard values within the field/parameter	Normative action/comment
<<Address-field>>			
	<NLF>	1	New link
	<LLN>	2 to 6	Assignable LLN (class B operation), PT initiated establishment of multiple frame operation
		7	LLN unassigned (class B operation), FT initiated establishment of multiple frame operation.
	<SAPI>	0	Connection oriented
	<C/R>	0	PT command
		1	FT command
	<RES>	1	
<<Control-field>>			
	<N(R)>	0	N(R)=V(R)
	<P/F>	1	Poll
	<N(S)>	0	N(S)=V(S)
<<Length-indicator-field>>			
		0	No higher layer information
		1.to 63	Higher layer info length
	<M>	All	
	<N>	1	No extended length field. If "0" the frame may be discarded
<<Information field>>		All appropriate	Higher layer information. If field indicates "0" it shall be omitted.
<<Fill field>>		11110000B	Ignore. 0 to 4 such octets may be included in case for the C _s logical channel, as the Frame Length (FLEN) mod 5 = 0. If indicates "0", no <Fill field> is required.
<<Checksum field1>>		All	The contents shall be calculated using two elements: LSIG see EN 300 175-4 [4] subclause 10.3.1; underlying checksum calculation based on ISO/IEC 8073
<<Checksum field2>>		All	See above

Table 7.19: Values used within the RR-frame during Class B link establishment

Field	Parameter within the field	Standard values within the field/parameter	Normative action/comment
<<Address-field>>			
	<NLF>	1	New link
	<LLN>	1	Reject of class B operation (NOTE)
		2.to.6	Class B accept value of LLN
	<SAPI>	0	Connection oriented
	<C/R>	0	FT response
		1	PT response
	<RES>	1	
<<Control-field>>			
	<N(R)>	1	N(R) = V(R)
	<P/F>	0	Final. Reject of class B operation (NOTE)
		1	Final. Accept of class B operation
	<SS>	0	
	<***>	1	Constant
<<Length-indicator-field>>			
		0	No higher layer information
	<M>	0	
	<N>	1	No extended length field. If "0" the frame may be discarded
<<Checksum field1>>		All	
<<Checksum field2>>		All	
NOTE: If a class A link does not already exist, a rejection of class B operation shall instance a class A LAPC entity. In this event, the LAPC entity at the responding side shall inform the NWK layer by issuing a DL_ESTABLISH-ind primitive to the NWK layer indicating class A operation. If a class A link already exists, a rejection of class B operation shall cause no further action.			

7.7.1.1 Associated procedures

7.7.1.1.1 Timer <DL.02> management

<DL.02>: Class B establishment timer.

Value: Refer to EN 300 175-4 [4], annex A.

Start: A class B link establishment I_frame is transmitted.

Stop: On receipt of: a class B errorless RR or class A errorless RR with the New Link Flag (NLF) bit set to "1"; a DL_RELEASE-req primitive indicating "abnormal"; a MAC_DIS-ind primitive.

7.7.1.1.2 Re-transmission counter management

Refer to EN 300 175-4 [4], subclauses 9.2.4.2 and 9.2.5.7.

Each LAPC entity shall maintain an internal re-transmission count variable determining the maximum number of re-transmissions of an I_frame. The default value shall be 3.

7.7.1.1.3 Multiple frame operation variables management

Refer to EN 300 175-4 [4], subclause 7.5.2.

For the DLC layer acknowledged transfer to be performed the V(S), V(A), and V(R) operation variables together with their appropriate management shall be supported.

The allowed values of all state variables for a given class of operation shall always be defined by the modulus operation. For class B operation, the modulus equals 8.

7.7.1.2 Exceptional cases

7.7.1.2.1 Timer <DL.02> expiry

If a RR response is received with the NLF bit set to "0" or containing errors the LAPC entity shall discard it. If the peer finds errors in the I_frame, response shall not be generated. In both cases timer <DL.02> shall expire. An action shall be taken according to EN 300 175-4 [4], subclause 9.2.4.2.

7.7.1.2.2 Receipt of a request for link release

If DL_RELEASE-req primitive is received timer <DL.02> shall be stopped. class B link release procedure shall be performed (see subclause 10.3).

7.7.1.2.3 Receipt of an indication for a connection release

Timer <DL.02> shall be stopped, all outstanding data shall be discarded, and, the NWK layer shall be informed of the MAC failure by DL_RELEASE-ind primitive.

7.7.2 Class B multiple frame operation

The procedure shall be performed as defined in subclauses 9.2.1.2 and 9.2.5 of EN 300 175-4 [4]. The following text together with the associated subclauses define the mandatory requirements with regard to the present document.

During class B multiple frame operation, the maximum number of outstanding I-frames (the window size) shall be set to "3" for both directions (see subclause 7.5.2.2 of EN 300 175-4 [4]).

During class B multiple frame operation the supervisory frames RR, RNR and REJ shall be supported as well as I-frames. Setting of P and F bit shall be supported as specified in subclauses 9.2.1.2 and 9.2.5 of EN 300 175-4 [4]. This implies that the different conditions (i.e. own receiver busy condition, peer receiver busy condition, timer recovery condition, reject exception condition etc.) shall be maintained and acted upon.

During class B multiple frame operation timer <DL.04> shall be maintained as specified in subclause 9.2.5 of EN 300 175-4 [4].

This profile does not require support of segmentation of I-frames and class B acknowledged link suspension during class B multiple frame operation.

The following tables specify the values which shall be supported within the different frames during class B multiple frame operation.

Table 7.20: Values used within the I-frame during class B multiple frame operation

Field	Parameter within the field	Standard values within the field/parameter	Normative action/comment
<<Address-field>>			
	<NLF>	0	Flag cleared. No new link.
	<LLN>	2.to.6	Assigned LLN (class B operation). Use the LLN which was assigned during establishment
	<SAPI>	0	Connection oriented
	<C/R>	0	From PT
		1	From FT
	<RES>	1	
<<Control-field>>			
	<N(R)>	0.to.7	N(R)=V(R) in I_frame transmitter
	<P/F>	0	Poll. Normal condition.
		1	Poll. F bit shall be set in next response. See subclauses 9.2.1.2 and 9.2.5 of EN 300 175-4[4] for conditions for setting

Field	Parameter within the field	Standard values within the field/parameter	Normative action/comment
<<Length-indicator-field>>	<N(S)>	0.to.7	N(S)=V(S) in I_frame transmitter
		1.to.63	Higher layer info length
	<M>	All	
	<N>	1	No extended length field. If "0" the frame may be discarded
<<Information field>>		All appropriate	Higher layer information. If field indicates "0" it shall be omitted.
<<Fill field>>		11110000B	Ignore. 0 to 4 such octets may be included in case for the C _s logical channel, as the Frame Length (FLEN) mod 5 = 0. If indicates "0", no <Fill field> is required.
<<Checksum field1>>		All	
<<Checksum field2>>		All	

Table 7.21: Values used within the RR-frame during class B multiple frame operation

Field	Parameter within the field	Standard values within the field/parameter	Normative action/comment
<<Address-field>>			
	<NLF>	0	Flag cleared.
	<LLN>	2.to.6	Assigned LLN (class B operation). Use the LLN which was assigned during establishment
	<SAPI>	0	Connection oriented
	<C/R>	0	FT response
		1	PT response
	<RES>	1	
<<Control-field>>			
	<N(R)>	0.to.7	N(R) = V(R) in RR frame transmitter
	<P/F>	0	See subclause 9.2.5 of EN 300 175-4 [4] for conditions
		1	See subclause 9.2.5 of EN 300 175-4 [4] for conditions for setting
	<SS>	0	
	<***>	1	Constant
<<Length-indicator-field>>			
		0	No higher layer information
	<M>	0	
	<N>	1	No extended length field. If "0" the frame may be discarded
<<Checksum field1>>		All	
<<Checksum field2>>		All	

Table 7.22: Values used within the RNR-frame during class B multiple frame operation

Field	Parameter within the field	Standard values within the field/parameter	Normative action/comment
<<Address-field>>			
	<NLF>	0	Flag cleared.
	<LLN>	2.to.6	Assigned LLN (class B operation). Use the LLN which was assigned during establishment
	<SAPI>	0	Connection oriented
	<C/R>	0	FT response
		1	PT response
	<RES>	1	
<<Control-field>>			
	<N(R)>	0.to.7	N(R) = V(R) in RNR frame transmitter
	<P/F>	0	See subclause 9.2.5 of EN 300 175-4 [4] for conditions
		1	See subclause 9.2.5 of EN 300 175-4 [4] for conditions for setting
	<SS>	01B	RNR
	<***>	1	Constant
<<Length-indicator-field>>			
		0	No higher layer information
	<M>	0	
	<N>	1	No extended length field. If "0" the frame may be discarded
<<Checksum field1>>		All	
<<Checksum field2>>		All	

Table 7.23: Values used within the REJ-frame during class B multiple frame operation

Field	Parameter within the field	Standard values within the field/parameter	Normative action/comment
<<Address-field>>			
	<NLF>	0	Flag cleared.
	<LLN>	2.to.6	Assigned LLN (class B operation). Use the LLN which was assigned during establishment
	<SAPI>	0	Connection oriented
	<C/R>	0	FT response
		1	PT response
	<RES>	1	
<<Control-field>>			
	<N(R)>	0.to.7	Requests retransmission of I-frames starting with N(R)
	<P/F>	0	See subclause 9.2.5 of EN 300 175-4[4] for conditions
		1	See subclause 9.2.5 of EN 300 175-4[4] for conditions for setting
	<SS>	10B	REJ
	<***>	1	Constant
<<Length-indicator-field>>			
		0	No higher layer information
	<M>	0	
	<N>	1	No extended length field. If "0" the frame may be discarded
<<Checksum field1>>		All	
<<Checksum field2>>		All	

7.7.2.1 Class B multiple frame operation with segment reassemble

As the required length of a NWK layer messages to be supported in GAP is 63 octets the segmentation of NWK layer messages in the DLC layer is not required to be supported for implementations complying to GAP.

If an implementation supporting longer messages wants to access a GAP implementation which does not support segmentation, the last shall act as follows:

- acknowledge the receipt of each error free, in sequence segment;
- do not store any segment after the first;
- deliver to its own NWK layer only the first segment.

7.7.2.2 Associated procedures

7.7.2.2.1 Timer <DL.04> management

<DL.04>: Retransmission timer.

Value: Refer to EN 300 175-4 [4], annex A.

Start: An I_frame is transmitted and <DL.04> is not running, see subclause 9.2.5.1 in EN 300 175-4 [4].

Stop: On receipt of a valid I, RR or RNR-frame with N(R) higher than the V(A) (i.e. acknowledgement for outstanding frames) or REJ-frame with N(R) equal to V(A), see subclause 9.2.5.3.2 in EN 300 175-4 [4];
On receipt of a DL_RELEASE-req primitive indicating "abnormal" or a MAC_DIS-ind primitive.

Restart: If timer <DL.04> has been stopped (reset) by the receipt of an I, RR or RNR-frame, and if there are outstanding frames still unacknowledged the <DL.04> timer shall be restarted. See subclause 9.2.5.3.2 in EN 300 175-4 [4].
At transmission of appropriate supervisory command during timer recovery condition (see subclause 9.2.5.5 and 9.2.5.7 in EN 300 175-4 [4].

7.7.2.2.2 Re-transmission counter management

Refer to subclause 7.7.1.1.2.

7.7.2.2.3 Multiple frame operation variables management

Refer to subclause 7.7.1.1.3.

7.7.2.2.4 Exception handling

Exception handling (sequence errors etc.) shall be performed as specified in EN 300 175-4[4], subclause 9.2.9.

7.7.2.3 Exceptional cases

7.7.2.3.1 Timer <DL.04> expiry

Refer to EN 300 175-4 [4], subclause 9.2.5.7.

An errored or erroneous I-frame shall be discarded and therefore shall not generate peer response.

An errored or erroneous frame-acknowledgement shall be discarded and timer <DL.04> shall not be stopped.

7.7.2.3.2 Receipt of a request for link release

On receipt of a DL_RELEASE-req after a I-frame has been transmitted timer <DL.04> shall be stopped, and, class B link release procedure (see subclause 10.3) shall be performed.

7.7.2.3.3 Receipt of an indication for a connection release

On receipt of an indication from the MAC layer for a release meaning either a bearer release started by the MAC layer or a bearer release resulting from a link release initiated by the peer, the timer <DL.04> shall be stopped and class B unacknowledged link suspension procedure (see subclause 10.4.1) shall be performed.

7.7.2.3.4 DLC wants to make a connection handover

See class B connection handover procedures given in subclause 9.2.7.3.2 of EN 300 175-4 [4].

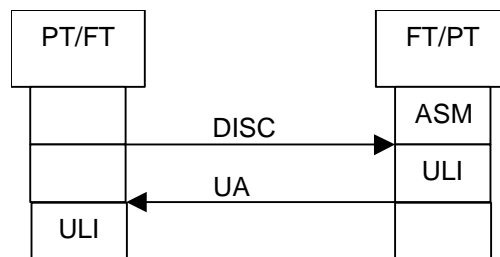
7.7.3 Class B link release

The procedure shall be performed as defined in subclauses 9.2.6, 9.2.7.1.2, 10.2.2, 10.4.1 of EN 300 175-4 [4], subclause 8.1.6 of EN 300 175-3 [3] and subclause 17.9 of EN 300 175-5 [5]. The following text together with the associated subclauses defines the mandatory requirements with regard to the present document.

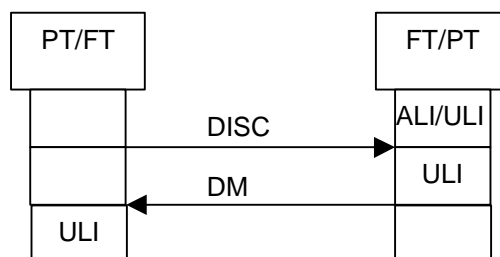
The procedure for class B link release is initiated on receipt of a DL_RELEASE-req primitive.

A link release procedure is qualified as "normal" if no outstanding I-frames or outstanding DL_DATA-req primitives have been discarded before the link has been released.

Even if in the DL_RELEASE-req primitive a "normal" link release has been requested, the DLC layer might be unable to process all outstanding data. If any outstanding I-frames or DL_DATA-req primitives were or have to be discarded the release is qualified as "abnormal" and the resulting "abnormal" release mode shall be indicated in the DL_RELEASE-cfm and DL_RELEASE-ind primitives respectively.



**Figure 7.8: Class B link release, receiving entity in ASM state.
Sequence applies in both directions**



**Figure 7.9: Class B link release, receiving entity in ALI or ULI state.
Sequence applies in both directions**

Table 7.24: Values used within the DISC command during class B link release

Field	Parameter within the field	Standard values within the field / parameter	Normative action/comment
<<Address-field>>			
	<NLF>	1	NLF flag set
	<LLN>	2.to.6	LLN value of the link to be released
	<SAPI>	0	Connection oriented
	<C/R>	0	PT command
		1	FT command
	<RES>	1	
<<Control-field>>			
	<bit 6-8>	010B	Constant
	<P>	1	Poll.
	<bit 3-4>	00B	Constant
	<bit 1-2>	11B	Constant
<<Length-indicator-field>>			
		0	No higher layer information
	<M>	0	
	<N>	1	No extended length field. If "0" the frame may be discarded
<<Checksum field1>>		All	
<<Checksum field2>>		All	

Table 7.25: Values used within the UA response during class B link release

Field	Parameter within the field	Standard values within the field/parameter	Normative action/comment
<<Address-field>>			
	<NLF>	1	NLF flag set
	<LLN>	2.to.6	LLN value of the link to be released
	<SAPI>	0	Connection oriented
	<C/R>	0	FT response
		1	PT response
	<RES>	1	
<<Control-field>>			
	<bit 6-8>	011B	Constant
	<P/F>	1	Final.
	<bit 3-4>	00B	Constant
	<bit 1-2>	11B	Constant
<<Length-indicator-field>>			
		0	No higher layer information
	<M>	0	
	<N>	1	No extended length field. If "0" the frame may be discarded
<<Checksum field1>>		All	
<<Checksum field2>>		All	

Table 7.26: Values used within the DM response during class B link release

Field	Parameter within the field	Standard values within the field/parameter	Normative action/comment
<<Address-field>>			
	<NLF>	1	NLF flag set
	<LLN>	2.to.6	LLN value of the link to be released
	<SAPI>	0	Connection oriented
	<C/R>	0	FT response
		1	PT response
	<RES>	1	Final
<<Control-field>>			
	<bit 6-8>	000B	Constant
	<P/F>	1	Final.
	<bit 3-4>	11B	Constant
	<bit 1-2>	11B	Constant
<<Length-indicator-field>>			
		0	No higher layer information
	<M>	0	
	<N>	1	No extended length field. If "0" the frame may be discarded
<<Checksum field1>>		All	
<<Checksum field2>>		All	

7.7.3.1 Associated procedures

7.7.3.1.1 LLME U-plane release

The procedure shall be performed as defined in EN 300 175-4 [4], subclause 7.7.4.2.

7.7.3.1.2 LLME release a MAC connection

The procedure shall be performed as defined in of EN 300 175-4 [4], subclause 10.2.2 and EN 300 175-3 [3], subclause 8.1.6.

7.7.3.1.3 Timer <DL.00> management

<DL.00>: Link release timer.

Value: Refer to EN 300 175-4 [4], annex A.

Start: A DISC command frame is transmitted.

Stop: UA or DM response frame is received with F bit set to "1" or a MAC_DIS-ind primitive is received.

7.7.3.2 Exceptional cases

7.7.3.2.1 Timer <DL.00> expiry

If timer <DL.00> expires the LAPC entity shall report "abnormal" release to the NWK layer with a DL_RELEASE-ind primitive and shall enter the ULI state.

Refer to EN 300 175-4 [4], subclause 9.2.6.

7.7.3.2.2 Receipt of an indication for a connection release

On receipt of an indication from the MAC layer for a release meaning either a bearer release started by the MAC layer or a bearer release resulting from a link release initiated by the peer, the timer <DL.00> shall be stopped the LAPC entity shall report "abnormal" release to the NWK layer with a DL_RELEASE-ind primitive and shall enter the ULI state.

7.7.3.3.3 Collision of identical transmitted and received commands

Refer to EN 300 175-4 [4], subclause 9.2.9.2.4.

7.7.4 Class B link suspension and resumption

The procedure shall be performed as defined in subclauses 9.2.7.1 and 9.2.7.1.2 of EN 300 175-4 [4]. The following text together with the associated subclauses define the mandatory requirements with regard to the present document.

With the purpose to handle unexpected upwards releases as reported with a MAC_DIS-ind primitive shall this profile support unacknowledged suspend procedure as specified in subclause 9.2.7.1.2 of EN 300 175-4 [4]. Correspondingly shall class B link resumption with an I-frame command be supported as specified in subclause 9.2.7.2 of EN 300 175-4 [4].

This profile does not require support of acknowledged suspend and link resumption with a SABM-frame.

7.7.4.1 Unacknowledged suspend

The procedure shall be performed as defined in subclause 9.2.7.1.2 of EN 300 175-4 [4]

NOTE: It is not required to invoke unacknowledged suspend procedure if the LAPC class B entity is in ULI state when receiving the MAC_DIS-ind (i.e. while in the "RELEASE-PENDING" state, see EN 300 175-5 [5]).

7.7.4.2 Class B link resumption

This profile requires that class B link resumption with I-frame command is supported. The procedure is defined in subclause 9.2.7.2 of EN 300 175-4 [4].

7.7.4.3 Associated procedures

7.7.4.3.1 Timer <DL.03> management

<DL.03>: Link resume timer.

Value: Refer to EN 300 175-4 [4], annex A.

Start: I-command frame requesting resumption is transmitted.

Stop: An accept response frame (RR, RNR, REJ with F bit = "1") or a reject response frame (DM) is received. A MAC_DIS-ind primitive is received.

7.7.4.4 Exceptional cases

7.7.4.4.1 Timer <DL.03> expiry

If timer <DL.03> expires the LAPC entity shall report "abnormal" release to the NWK layer with a DL_RELEASE-ind primitive and shall enter the ULI state.

7.7.4.4.2 Receipt of an indication for a connection release

On receipt of an indication from the MAC layer for a release meaning either a bearer release started by the MAC layer or a bearer release resulting from a link release initiated by the peer, the timer <DL.03> shall be stopped the LAPC entity shall report "abnormal" release to the NWK layer with a DL_RELEASE-ind primitive and shall enter the ULI state.

7.7.5 Class B link re-establishment

The procedure shall be performed as defined in subclauses 9.2.8 of EN 300 175-4 [4] and subclause 17.8 of EN 300 175-5 [5]. The following text together with the associated subclauses define the mandatory requirements with regard to the present document.

A class B link may be re-established at any time, except whilst in the "RELEASE-PENDING" state, see EN 300 175-5 [5], subclause 14.2.7.

All outstanding DL_DATA primitives and I-frames shall be discarded, and all link variables shall be reset.

An implementation is permitted to reject the attempt for re-establishment and release the link (i.e. respond with a DM response).

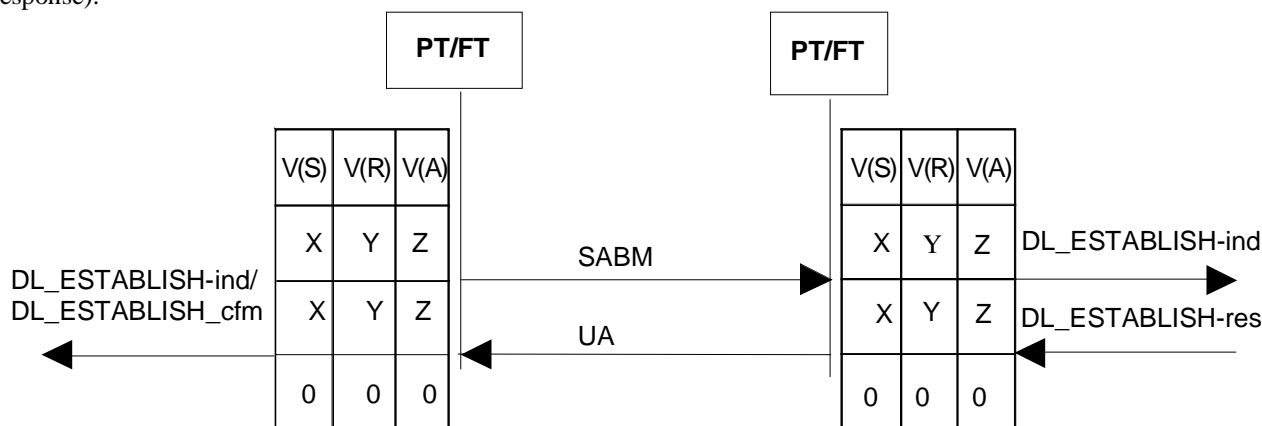


Figure 7.10: Class B link re-establishment, accepted. The same sequence applies in both directions

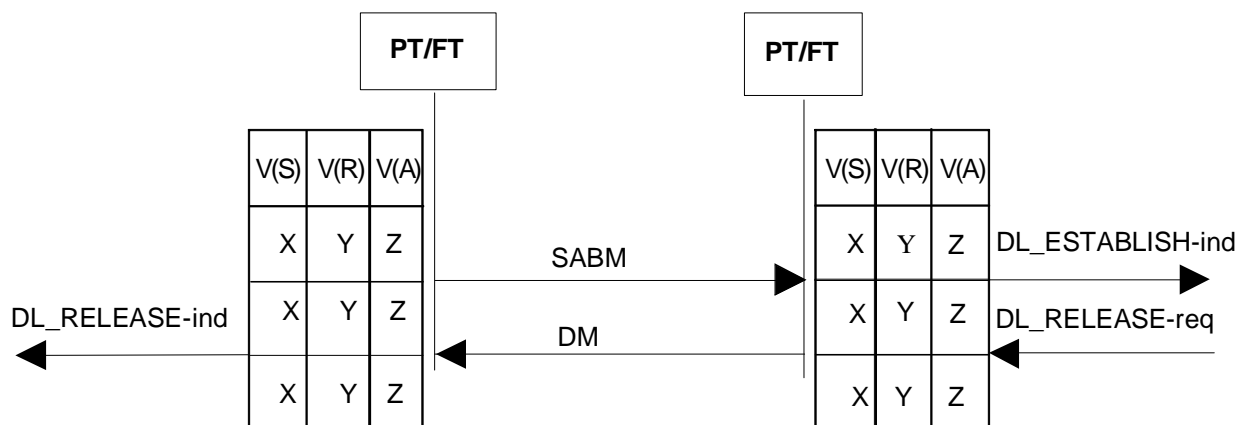


Figure 7.11: Class B link re-establishment, rejected. The same sequence applies in both directions

Table 7.27: Values used within the SABM command during class B link re-establishment

Field	Parameter within the field	Standard values within the field/parameter	Normative action/comment
<<Address-field>>			
	<NLF>	1	NLF flag set
	<LLN>	2.to.6	LLN value of the link to be re-established
	<SAPI>	0	Connection oriented
	<C/R>	0	PT command
		1	FT command
	<RES>	1	
<<Control-field>>			
	<bit 6-8>	001B	Constant
	<P>	1	Poll.
	<bit 3-4>	11B	Constant
	<bit 1-2>	11B	Constant
<<Length-indicator-field>>			
		0	No higher layer information
	<M>	0	
	<N>	1	No extended length field. If "0" the frame may be discarded
<<Checksum field1>>		All	
<<Checksum field2>>		All	

Table 7.28: Values used within the UA response during class B link re-establishment

Field	Parameter within the field	Standard values within the field/parameter	Normative action/comment
<<Address-field>>			
	<NLF>	1	NLF flag set
	<LLN>	2.to.6	LLN value of the link to be re-established
	<SAPI>	0	Connection oriented
	<C/R>	0	FT response
		1	PT response
	<RES>	1	
<<Control-field>>			
	<bit 6-8>	011B	Constant
	<P/F>	1	Final.
	<bit 3-4>	00B	Constant
	<bit 1-2>	11B	Constant
<<Length-indicator-field>>			
		0	No higher layer information
	<M>	0	
	<N>	1	No extended length field. If "0" the frame may be discarded
<<Checksum field1>>		All	
<<Checksum field2>>		All	

Table 7.29: Values used within the DM response during class B link re-establishment

Field	Parameter within the field	Standard values within the field/parameter	Normative action/comment
<<Address-field>>			
	<NLF>	1	NLF flag set
	<LLN>	2.to.6	LLN value of the link to be released
	<SAPI>	0	Connection oriented
	<C/R>	0	FT response
		1	PT response
	<RES>	1	Final
<<Control-field>>			
	<bit 6-8>	000B	Constant
	<P/F>	1	Final.
	<bit 3-4>	11B	Constant
	<bit 1-2>	11B	Constant
<<Length-indicator-field>>			
		0	No higher layer information
	<M>	0	
	<N>	1	No extended length field. If "0" the frame may be discarded
<<Checksum field1>>		All	
<<Checksum field2>>		All	

7.7.5.1 Associated procedures

7.7.5.1.1 Timer <DL.02> management

<DL.02>: Class B establishment timer.

Value: Refer to EN 300 175-4 [4], annex A.

Start: A class B link re-establishment SABM frame is transmitted.

Stop: On receipt of a UA response, a DM response or a MAC_DIS-ind primitive.

7.7.5.2 Exceptional cases

7.7.5.2.1 Timer <DL.02> expiry

UA or DM responses received with the F bit set to "0" shall be ignored. In both cases timer <DL.02> shall expire. The re-establishment shall be considered as unsuccessful and a link release procedure shall be performed, (see subclause 10.3).

7.7.5.2.2 Receipt of a request for link release

A request for link release shall be handled as defined in subclause 9.2.8.2 of EN 300 175-4 [4]. A DL_RELEASE-req primitive that is received during re-establishment shall be queued, and shall be serviced immediately on completion of the re-establishment procedure.

7.7.5.2.3 Receipt of an indication for a connection release

Timer <DL.02> shall be stopped, and the NWK layer shall be informed of the MAC failure by a DL_RELEASE-ind primitive.

7.7.5.2.4 Collision of identical transmitted and received commands

Refer to EN 300 175-4 [4], subclause 9.2.9.2.4.

7.8 MAC layer procedures

Not applicable.

7.9 PHY layer requirements

Not applicable.

7.10 Management procedures

7.10.1 Broadcast attribute management

The PP and FP shall support the extended higher layer broadcast attributes as defined in the following:

Table 7.30: Broadcast attributes interpretation by the IUT PP

BIT Number	Attribute	Value	Note
a43	LRMS profile support	1B	Indicates that LRMS is supported. Further details about the supported service are exchanged during messaging call setup

Annex A (normative): Support of MMSP by the DECT lower layers

A.1 Profile-specific information elements

The information elements defined in this annex are identified in EN 300 175-5 [5] with reference to this profile. The specification of these elements is given below.

A.1.1 MMS Generic Header information element

The <<MMS-GENERIC-HDR>> information element is mandatory for all M-MMS messages. It identifies the type of MMS command or response/reply and enables their association, identifies the MMS service (and sub-service) type(s) and returns the outcome of MMS commands.

Bits								Octet:
8	7	6	5	4	3	2	1	
0	<<MMS-GENERIC-HDR>>							1
Length of Contents (L)								2
0/1	MMS Command type				Rpy Req			3
1	Extended MMS Command type							3a
0/1	MMS message identifier							4
1	Extended MMS message identifier							4a
0/1	Service type							5
1	Service Sub-type							5a
0/1	Command Outcome							6
0/1	Command Outcome - IE support							6a
1	Command Outcome - IE support							6b

MMS Command type (octet 3):

Bits	7	6	5	4	3	Meaning
	0	0	0	0	0	MMS-SEND
	0	0	0	1	0	MMS-SEND-REQ
	0	0	0	x	1	MMS-SEND-RPY
	0	0	1	0	0	MMS-RETRIEVE
	0	0	1	1	0	MMS-RETRIEVE-HDR
	0	0	1	x	1	MMS-RECEIVE-RPY
	0	1	0	0	0	MMS-EXT-CMD (Octet 3a shall always be sent with this coding)
	0	1	0	0	1	MMS-EXT-CMD-RPY (Octet 3a shall always be sent with this coding)
	0	1	0	1	0	MMS-STATUS (Octet 3a shall always be sent with this coding)
	0	1	0	1	1	MMS-STATUS-RPY (Octet 3a shall always be sent with this coding)
	0	1	1	0	0	MMS-ESC-CMD (Octet 3a shall always be sent with this coding)
	0	1	1	0	1	MMS-ESC-CMD-RPY (Octet 3a shall always be sent with this coding)

Reply requested (octet 3):

Bits	2	1	Meaning
	x	0	Reply not requested from the MCE
	x	1	Reply requested from the MCE
	0	x	Reply not requested from the EE
	1	x	Reply requested from the EE

Extended MMS Command type (octet 3a):

When used with the MMS Command coding (Octet 3) = MMS-EXT-CMD or MMS-EXT-CMD-RPY this octet shall have the following meaning:

Bits	7 6 5 4 3 2 1	Meaning
	Connection Related	
	0 0 0 0 0 0	Reset MMS connection
	0 0 0 1 0 0 0	MCE login
	0 0 0 1 0 0 1	MCE logout
	0 1 1 1 0 0 0	Retrieve MCE capabilities
	0 1 1 1 0 0 1	Retrieve EE capabilities
	0 1 1 1 0 1 0	Retrieve current date, time and time-zone
	Message Related: transfers and commands	
	1 0 0 0 0 0 0	Interrupt MMS message transfer
	1 0 0 0 0 0 1	Resume MMS message transfer
	1 0 0 0 0 1 0	Cancel MMS command
	Message Related: MCE manipulation	
	1 0 0 1 0 0 0	Delete message
	1 0 0 1 0 0 1	Replace message
	1 0 0 1 0 1 0	Retrieve directory contents
	1 0 0 1 0 1 1	Change current directory
	1 0 0 1 1 0 0	Create new directory
	All other values reserved.	

When used with the MMS Command coding (Octet 3) = MMS-STATUS or MMS-STATUS-RPY this octet shall have the following meaning:

Bits	7 6 5 4 3 2 1	Meaning
	0 0 0 0 0 0 0	Retrieve message status
	0 0 0 0 0 0 1	Retrieve status of all pending messages
	0 0 0 0 0 1 0	New message(s) available for retrieval
	1 0 0 0 0 0 0	MMS entity has message storage available
	1 0 0 0 0 0 1	MMS entity has no message storage available
	All other values reserved.	

When used with the MMS Command coding (Octet 3) = MMS-ESC-CMD or MMS-ESC-CMD-RPY this octet shall be used to identify manufacturer specific commands which are not implemented with the standard MMS commands.

MMS message identifier (octet 4) and extended MMS identifier (octet 4a):

8	7	6	5	4	3	2	1
0/1	I/R	Rply seq		Action ID part 1			
1	Action ID part 2 (optional)						

I/R indicates initiate/reply

Rply seq is a reply sequence number. Coded as a natural binary value and the least significant bit is in position 5.

Action ID indicates action identifier.

Service type (octet 5) (Optional):

This octet may be omitted provided octet 5a and 6 are not required. If omitted the receiving entity shall assume a coding of 0 0 0 0 0 0 0.

Bits	7 6 5 4 3 2 1	Meaning
	0 0 0 0 0 0 0	Unspecified/ not applicable
	0 0 0 0 0 0 1	Any method
	0 0 0 0 0 1 0	Address and Data category and type based IWU selection
	0 0 0 0 0 1 1	A message handling facility
	0 0 0 0 1 0 0	Physical
	0 0 0 1 0 0 0	Voice telephony
	0 0 0 1 0 0 1	Telex
	0 0 0 1 0 1 0	Teletex
	0 0 0 1 0 1 1	Facsimile group 3 (Real-time)
	0 0 0 1 1 0 0	Facsimile group 4 (Real-time)
	0 0 0 1 0 1 1	Facsimile group 3 (Store and forward)
	0 0 0 1 1 0 0	Facsimile group 4 (Store and forward)
	0 0 0 1 1 0 1	Videotex (ITU-T Recommendations T.100 /T.101)
	0 0 1 0 0 0 0	ERMES
	0 0 1 0 0 0 1	National paging
	0 0 1 0 0 1 0	UCI (ETS 300 133-3)
	0 0 1 0 0 1 1	GSM SMS
	0 0 1 0 1 0 0	Native DECT MMS
	0 0 1 0 1 1 0	IA5 terminal
	0 0 1 0 1 1 1	X.400 message handling
	0 1 0 0 0 0 0	FTP
	0 1 0 0 0 0 1	World Wide Web (WWW)
	0 1 0 0 0 1 0	Gopher
	0 1 0 0 0 1 1	News
	0 1 0 0 1 0 0	News/NNTP
	0 1 0 0 1 0 1	Telnet
	0 1 0 0 1 1 0	Wide area info server
	0 1 0 0 1 1 1	Host specific file names
	1 1 x x x x x	Reserved for proprietary service types
	All other values reserved.	

Service Sub-type (octet 5a) (Optional):

This octet is optional. If omitted the receiving entity shall assume a coding of 0 0 0 0 0 0 0.

Bits	7 6 5 4 3 2 1	Meaning
	0 0 0 0 0 0 0	Default/Undefined

All other codings shall be interpreted uniquely for each service type (octet 5) coding. These codings are given in the interworking specifications for each of the service types. In general this coding is used to select the MCE IWU or a specific functionality within the MMS IWU.

Command outcome (octet 6) (Optional):

This octet shall only be sent if the MMS Command type (octet 3) = MMS-xxxx-RPY.

Bits	7 6 5 4 3 2 1	Meaning
		Successful transactions:
	0 0 0 0 0 0 0	Command successfully completed by the MCE
	0 0 0 0 0 0 1	Command received by the MCE and pending
	0 0 0 0 1 0 0	MMS Send Request (MMS-SEND-REQ) granted
	0 0 0 0 1 0 1	MMS Send Request (MMS-SEND-REQ) granted and capability reserved
	0 0 0 0 1 1 0	MMS Send Request (MMS-SEND-REQ) granted for default service configuration only.
	0 0 0 1 0 0 0	Message received or retrieved by the EE
	0 0 0 1 0 0 1	Message sent to the EE
	0 0 0 1 0 1 0	Message object header sent to EE
	0 0 0 1 0 1 1	Message waiting notified to EE
		Temporary Errors:
	0 1 0 0 0 0 0	Congestion
	0 1 0 0 0 0 1	EE busy
	0 1 0 0 0 1 0	No response from EE
	0 1 0 0 0 1 1	Unable to carry out Command due to temporary MCE comms failure
	0 1 0 0 1 0 0	Quality of service not available
	0 1 0 0 1 0 1	Error in EE
	0 1 0 0 1 1 0	No memory available
	0 1 0 0 1 1 1	No processing capability available
	0 1 0 1 0 0 0	MMS Send Request (MMS-SEND-REQ) not granted, re-send previous MMS Object, if possible
	0 1 1 0 0 0 0	No data conversion capability available
		Permanent Errors:
	1 0 0 0 0 0 0	Command (and/or Ext. Command) not supported
	1 0 0 0 0 0 1	Unable to carry out Command due to lack of IE support
	1 0 0 0 0 1 0	Unable to carry out Command due to permanent MCE comms failure
	1 0 0 0 1 0 0	Invalid address
	1 0 0 0 1 0 1	Invalid network (End User not accessible)
	1 0 0 0 1 1 0	Unknown Multipart Parent Message Identifier
	1 0 0 1 0 0 0	EE not available
	1 0 0 1 0 0 1	EE cannot support MMS Object type
	1 0 0 1 1 0 0	Service type not supported
	1 0 0 1 1 0 1	Service Sub-type not supported
	1 0 1 0 0 0 0	Incompatible file type
	1 0 1 0 0 0 1	Data conversion not supported
	1 0 1 0 0 1 0	Data conversion failed - source data corrupted
	1 0 1 0 0 1 1	Data conversion failed - source data too large
		All other values reserved.

Command outcome - IE support (octet 6a) (Optional):

This octet shall only be sent if the MMS Command type (octet 3) = MMS-xxxx-RPY.

These codings are used in a reply to a MMS command and in conjunction with "Command Outcome" (octet 6) to indicate information elements within the MMS command which are not supported by the receiving entity. This octet may be used with any of the "Command Outcome" (octet 6) codings.

Bits	7 6 5 4 3 2 1	Meaning
		Primary Part Information Elements (IEs) not supported:
	x x x x x x 1	<<CALLED-PARTY-NUMBER>> IE not supported with this command
	x x x x x 1 x	<<CALLED-PARTY-SUBADDR>> IE not supported with this command
	x x x x 1 x x	<<CALLING-PARTY-NUMBER>> IE not supported with this command
	x x x 1 x x x	<<TIME-DATE>> IE not supported with this command
	x x 1 x x x x	<<MMS-OBJ-HDR>> IE not supported with this command
	x 1 x x x x x	<<MMS-EXT-HDR>> IE not supported with this command
	1 x x x x x x	<<SEGMENTED-INFO>> IE not supported with this command

Command outcome - IE support (octet 6b) (Optional):

This octet shall only be sent if the MMS Command type (octet 3) = MMS-xxxx-RPY.

These codings are used in a reply to a MMS command and in conjunction with "Command Outcome" (octet 6) to indicate information elements within the MMS command which are not supported by the receiving entity. This octet may be used with any of the "Command Outcome" (octet 6) codings.

Bits	7 6 5 4 3 2 1	Meaning
Primary Part Information Elements (IEs) not supported:		
	x x x x x 1	<<REPEAT-INDICATOR>> IE not supported with this command
Secondary Part Information Elements (IEs) not supported:		
	x x x x x 1 x	<<MMS-EXT-HDR>> IE not supported with this command
	x x x x 1 x x	<<REPEAT-INDICATOR>> IE not supported with this command
	x x x 1 x x x	<<USER-DATA>> IE not supported with this command
	x x 1 x x x x	Reserved for future IEs not supported with this command
	x 1 x x x x x	Reserved for future IEs not supported with this command
	1 x x x x x x	Reserved for future IEs not supported with this command

A.1.2 MMS Object Header information element

The <<MMS-OBJ-HDR>> information element is mandatory for all M-MMS messages which contain or describe User Data. The information element describes the source data, its length, optionally destination data and optionally the multipart parent of the message.

Bits				Octet:
8	7	6	5 4 3 2 1	
0	<<MMS-OBJ-HDR>>			1
Length of Contents (L)				2
0/1	Resrv.	L desc.	# of L octets	3
User Data Length Octet 1 (most significant)				3a
User Data Length Octet 2				3b
User Data Length Octet 3				3c
User Data Length Octet 4				3d
User Data Length Octet 5				3e
User Data Length Octet 6				3f
User Data Length Octet 7				3g
User Data Length Octet 8 (least significant)				3h
0/1	Src UD Cat.	Source User Data Transfer Encoding		4
1	Dest UD Cat.	Destination User Data Transfer Encoding		4a
0/1	Source User Data type			5
0/1	Extended Source User Data type			5a
0/1	Destination User Data type			5b
1	Extended Destination User Data type			5c
0/1	Multipart parent Message Identifier			6
1	Multipart parent Extended Message ID			6a

Reserved (Resrv.) (octet 3):

Bits	7 6	Meaning
	x x	All values reserved.

Length description (L desc.) (octet 3):

Bits	5 4	Meaning
0 0		User data length specified (at least octet 3a shall be included)
0 1		User data length not specified (none of octets 3a-3h shall be included and # of octets coding shall be ignored)
1 0		No user data present (none of octets 3a-3h shall be included and # of octets coding shall be ignored)
1 1		Reserved

Number of length octets (# of octets.) (octet 3):

Bits	3 2 1	Meaning
	0 0 0	1 octet (octet 3a only shall be included)
	0 0 1	2 octets (octets 3a-3b shall be included)
	0 1 0	3 octets (octets 3a-3c shall be included)
	0 1 1	4 octets (octets 3a-3d shall be included)
	1 0 0	5 octets (octets 3a-3e shall be included)
	1 0 1	6 octets (octets 3a-3f shall be included)
	1 1 0	7 octets (octets 3a-3g shall be included)
	1 1 1	8 octets (octets 3a-3h shall be included)

User data length octets 1 up to 8 (octets 3a up to 3h):

These octets are coded as a natural binary value indicating the number of octets of User Data.

Source user data category (Src UD Cat.) (octet 4):

Bits	7 6	Meaning
	0 0	Audio user data
	0 1	Image user data
	1 0	Video user data
	1 1	Other user data

Source user data transfer encoding (octet 4):

Bits	5 4 3 2 1	Meaning
	0 0 0 0 0	No transfer encoding
	0 0 0 0 1	UUENCODE
	0 0 0 1 0	BASE64
	0 0 1 0 0	User data compressed using V.42bis
	0 0 1 0 1	User data compressed using ZIP
	0 1 0 0 0	User data encrypted using PGP
		All other values reserved.

Destination user data category (Dest UD Cat.) (octet 4a):

Bits	7 6	Meaning
	0 0	Audio user data
	0 1	Image user data
	1 0	Video user data
	1 1	Other user data

Destination user data transfer encoding (octet 4a):

Bits	5 4 3 2 1	Meaning
	0 0 0 0 0	No transfer encoding
	0 0 0 0 1	UUENCODE
	0 0 0 1 0	BASE64
	0 0 1 0 0	User data compressed using V.42bis
	0 0 1 0 1	User data compressed using ZIP
	0 1 0 0 0	User data encrypted using PGP
		All other values reserved.

Source user data type (octet 5):

Bits	7 6 5 4 3 2 1	Meaning
Single field user data types (octet 5a shall not be included):		
0 0 0 0 0 0 0		User data type unknown
0 0 0 0 0 0 1		Simple formattable document
0 0 0 0 0 1 0		Basic text
0 0 0 0 1 0 0		IA 5 text (ITU-T Recommendation T.50)
0 0 0 0 1 0 1		Telex
0 0 0 0 1 1 0		Teletex
0 0 0 1 0 0 0		Videotex (ITU-T Recommendations T.100)
0 0 0 1 0 0 1		TIFF image
0 0 0 1 0 1 0		GIF image
0 0 0 1 0 1 1		JPEG image
0 0 0 1 1 0 0		ITU-T Recommendation T.4 one dimensional coded image
0 0 0 1 1 0 1		ITU-T Recommendation T.4 two dimensional coded image
0 0 0 1 1 1 0		ITU-T Recommendation T.6 coded image
0 0 1 0 0 0 0		32 kbit/s ADPCM coded audio
0 0 1 0 0 0 1		16 kbit/s ADPCM coded audio
0 0 1 0 0 1 0		8 kbit/s ADPCM coded audio
0 0 1 0 0 1 1		AVI audio
0 0 1 0 1 0 0		AU audio
0 1 0 0 0 0 0		Telematic File Transfer (TFT), ITU-T Recommendation T.434
0 1 0 0 0 0 1		Encapsulated: RFC 822
0 1 0 0 0 1 0		Encapsulated: GSM SMS
0 1 0 0 0 1 1		Encapsulated: X.400
0 1 0 0 1 0 0		Postscript file
0 1 0 0 1 0 1		Extended postscript file
0 1 0 0 1 1 0		MPEG video
0 1 0 0 1 1 1		AVI video
0 1 0 1 0 0 0		MOV video
0 1 1 1 0 0 0		Multipart message parent - multiple messages (no user data shall be included in this MMS message, user data category shall be "Other user data")
0 1 1 1 0 0 1		Multipart message parent -single segmented message (no user data shall be included in this MMS message, user data category shall be "Other user data")
0 1 1 1 1 1 1		Multipart message end (no user data shall be included in this MMS message)

Double field user data types (octet 5a shall be included).**This field is used to define categories:**

1 0 0 0 0 0 0	Audio user data
1 0 0 0 0 0 1	Image user data
1 0 0 0 1 0 1	Image, replace previous image, user data
1 0 0 0 0 1 0	Video and audio combined user data
1 0 0 0 1 1 0	Video only user data
1 0 0 1 0 0 0	Operating system file
1 0 0 1 0 0 1	Application file
1 0 0 1 0 1 0	Executable file
1 0 0 1 0 1 1	Unformatted text
1 0 0 1 1 0 0	Formatted text
1 1 1 1 0 0 0	Multipart user data
1 1 1 1 1 1 1	Proprietary user data type

All other values reserved.

Extended source user data type (octet 5a):

Bits	7 6 5 4 3 2 1	Meaning
Codings applicable to all Source user data type codings (octet 5):		
0 0 0 0 0 0 0		Not applicable (used with 0 x x x x x codings for octet 5 when octet 5b is included)
Codings applicable only if Source user data type (octet 5) = Audio user data:		
0 0 0 0 0 0 1		Unknown audio user data coding
0 0 0 0 0 1 0		PCM 64 kbit/s
0 0 0 0 0 1 1		ADPCM 32 kbit/s
0 0 0 0 1 0 0		ADPCM 16 kbit/s
0 0 0 0 1 0 1		ADPCM 8 kbit/s
0 0 0 0 1 1 0		GSM full rate 13 kbit/s voice coding
0 0 1 0 0 0 0		AU audio coding
0 0 1 0 0 0 1		AVI audio coding
0 0 1 0 0 1 0		CD Music disc audio coding
All other values reserved.		
Codings applicable only if Source user data type (octet 5) = Image and Image, replace previous image, user data:		
0 0 0 0 0 0 1		Unknown image user data coding
0 0 0 0 0 1 0		GIF
0 0 0 0 0 1 1		TIFF
0 0 0 0 1 0 0		JPEG
0 0 0 0 1 0 1		PCX
0 0 0 0 1 1 0		DCX
All other values reserved.		
Codings applicable only if Source user data type (octet 5) = Video and audio combined user data:		
0 0 0 0 0 0 1		Unknown video and audio user data coding
0 0 0 0 0 1 0		MPEG
0 0 0 0 0 1 1		AVI
0 0 0 0 1 0 0		MOV
0 0 0 0 1 0 1		H.320
All other values reserved.		
Codings applicable only if Source user data type (octet 5) = Video only user data:		
All other values reserved.		
Codings applicable only if Source user data type (octet 5) = Operating system file user data:		
0 0 0 0 0 0 1		MSDOS general file
0 0 0 0 0 1 0		MSDOS system file
0 0 0 0 0 1 1		MSDOS executable file
0 0 0 0 1 0 0		MSDOS directory file
0 0 0 1 0 0 1		Windows 3 general file
0 0 0 1 0 1 0		Windows 3 system file
0 0 0 1 0 1 1		Windows 3 executable file
0 0 0 1 1 0 0		Windows 3 directory file
0 0 1 0 0 0 1		Windows 95 general file
0 0 1 0 0 1 0		Windows 95 system file
0 0 1 0 0 1 1		Windows 95 executable file
0 0 1 0 1 0 0		Windows 95 directory file
0 0 1 1 0 0 1		MAC general file
0 0 1 1 0 1 0		MAC system file
0 0 1 1 0 1 1		MAC executable file
0 0 1 1 1 0 0		MAC directory file
0 1 0 0 0 0 1		UNIX general file
0 1 0 0 0 1 0		UNIX system file
0 1 0 0 0 1 1		UNIX executable file
0 1 0 0 1 0 0		UNIX directory file
All other values reserved.		
Codings applicable only if Source user data type (octet 5) = Application user data:		
0 0 0 0 0 0 1		Unknown application user data coding
0 0 0 0 0 1 0		MS Word file
0 0 0 0 0 1 1		MS Excel file
0 0 0 0 1 0 0		MS Access file
0 0 0 0 1 0 1		MS Powerpoint file
0 0 0 0 1 1 0		Lotus Notes file
All other values reserved.		

Bits	7 6 5 4 3 2 1	Meaning
Codings applicable only if Source user data type (octet 5) = Executable file user data:		
0 0 0 0 0 0 1		Unknown executable file user data coding
0 0 0 0 0 1 0		Java applet
All other values reserved.		
Codings applicable only if Source user data type (octet 5) = Unformatted text user data:		
0 0 0 0 0 0 1		Unknown alphabet unformatted user data
0 0 0 0 0 1 0		IA 5 (ITU-T Recommendation T.50)
0 0 0 0 0 1 1		ASCII
All other values reserved.		
Codings applicable only if Source user data type (octet 5) = Formatted text user data:		
0 0 0 0 0 0 1		Unknown formatted text user data coding
0 0 0 0 0 1 0		Postscript
0 0 0 0 0 1 1		Extended postscript
All other values reserved.		
Codings applicable only if Source user data type (octet 5) = Multipart user data:		
All codings, except 0 0 0 0 0 0 0, reserved		
Codings applicable only if Source user data type (octet 5) = Proprietary user data:		
All codings, except 0 0 0 0 0 0 0, are proprietary.		

Destination user data type (octet 5b):

Bits	7 6 5 4 3 2 1	Meaning
0 0 0 0 1 0 0 0		Best match to MMS service type and Sub-type (octet 5a shall not be included)
All other values coded as for Source user data type (octet 5).		

Extended destination user data type (octet 5c):

Bits	7 6 5 4 3 2 1	Meaning
All codings as for Extended source user data (octet 5a).		

Multipart parent message identifier (octet 6):

This information field is used to associate a message part with its multipart parent.

All codings as for message identifier in subclause A.1.1 (octet).

Multipart parent extended message ID (octet 6a):

This information field is used to associate a message part with its multipart parent.

All codings as for Extended message identifier in subclause A.1.1 (octet a).

A.1.3 MMS Extended Header information element

The <<MMS-EXT-HDR>> information element is optional in all M-MMS messages. It contains information about MMS message attributes which cannot be accommodated in the general MMS IEs. This IE describes attributes which are particular to a specific MMS service or object type which it would not be appropriate or possible to describe in the general MMS headers. For this reason most of the codings are defined in the interworking annexes where the message attributes are used. References to those annexes are provided below.

Bits								Octet:
8	7	6	5	4	3	2	1	
0 <<MMS-EXT-HDR>>								1
Length of Contents (L)								2
0/1		Attribute Cat.			Attribute Identifier			3
1 Extended Attribute Identifier								3a
Message Attribute(s) (octet 1)								4
Message Attribute(s) (octet 2)								5
....								...
Message Attribute(s) (octet L-1 or L-2)								L+2

Attribute Category (octet 3):

Bits	7 6 5	Meaning
	0 0 0	Extended MMS Object header
	0 0 1	MCE IWU configuration parameters
	0 1 0	MMS IWU configuration parameters
	0 1 1	Capability parameters
	100	MCE Status parameters
	All other values reserved.	

Attribute identifier (octet 3):

All the Attribute identifier codings shall be interpreted uniquely for each Attribute category (octet 3, bits 5-7) coding.

Bits	4 3 2 1	Meaning
Codings applicable only if Attribute category (octet 3, bits 7 - 5) =		
Extended MMS Object header:		
	0 0 0 0	Group 3 facsimile object parameters, see subclause C.7.7.1.
	0 0 0 1	GSM SMS parameters
	0 0 1 0	MIME attributes
	0 0 1 1	HTTP attributes
	0 1 0 0	Group 3 facsimile Called Subscriber Identity (CSI), see subclause C.7.7.4.
Codings applicable only if Attribute category (octet 3, bits 7-5) =		
MCE IWU configuration parameters:		
	0 0 0 0	Group 3 facsimile transmission parameters, see subclause C.7.7.2.
Codings applicable only if Attribute category (octet 3, bits 7-5) =		
Capability parameters:		
	0 0 0 0	Group 3 facsimile capability parameters
	All other values reserved.	
Codings applicable only if Attribute category (octet 3, bits 7-5) =		
MCE Status parameters:		
	0 0 0 0	Number of messages waiting (Octet 4 shall follow).
	All other values reserved.	

Extended attribute identifier (octet 3a):

This octet is optional. All the Extended object attribute identifier codings shall be interpreted uniquely for each of the Attribute category and Attribute identifier (octet 3) codings. These codings are given in the interworking annexes for the MMS services where these message attributes are used as indicated in the Attribute identifier codings (octet 3, bits 1-4) above.

This field distinguishes among a number of sub-attributes for a given Attribute category and Attribute identifier (octet 3) coding, such as a range of MMS Object, Group 3 facsimile object parameters.

Message attribute(s) (octets 4 to L+2):

These octets are optional. The coding of the message attributes octets shall be interpreted uniquely for each of the Attribute category and Attribute identifier (octet 3) and Extended attribute identifier (octet 3a) codings. These codings are given in the interworking annexes for the MMS services where these message attributes are used as indicated in the Attribute identifier codings (octet 3, bits 1-4) above.

This field describes the MMS message attributes identified by octets 3 and 3a.

A.2 MMSP message implementation

A.2.1 General

This annex describes the implementation of the MMSP point-to-point and point-to-multipoint service in DECT. The implementation is illustrated in the form of mappings between the MMSP and DECT NWK layer elements.

The M-MMS messages specified in annex A.1 shall apply.

A.2.2 C-MMS primitives mapping rules

A.2.2.1 LRMS PTP C-MMS primitives

There is no concept of "C-MMS messages". Therefore C-MMS primitives are directly mapped to Mobile Network Call Control (MNCC) primitives.

The mapping shall be as follows as follows:

Table A.1: Primitive mapping between C-MMS and CC

MMS primitive	MNCC primitive
C-MMS-SETUP-{req, ind}	MNCC-SETUP-{req, ind}
C-MMS-CONNECT-{req, cfm, ind}	MNCC-CONNECT-{req, cfm, ind}
C-MMS-RELEASE- {req, cfm, ind, res}	MNCC-RELEASE- {req, cfm, ind, res}
C-MMS-MODIFY- {req, cfm, ind}	MNCC-MODIFY- {req, cfm, ind}

The parameters of corresponding primitives are identical.

A.2.2.2 LRMS PTM C-MMS primitives

No C-MMS part is present in the LRMS PTM thus no C-MMS primitives are defined nor mapped.

A.2.3 M-MMS message mapping rules

A.2.3.1 General rules for LRMS PTP

The primary part of an M-MMS message shall be placed into an {IWU-INFO} message.

The User data field of the secondary part shall be carried in the {IWU-INFO} message. Other fields of the secondary part shall not be conveyed.

A.2.3.2 General rules for LRMS PTM

These rules shall apply if MMSP messages are conveyed over the connectionless PTM link.

The primary part of an M-MMS message shall be placed into an {CLMS-VARIABLE} message.

The User data field of the secondary part shall be carried in the {CLMS-VARIABLE} message. Other fields of the secondary part shall not be conveyed.

A.2.3.3 Information element mapping rules

The following M-MMS information elements shall be mapped one to one on to elements with the same name in the network layer.

Table A.2: M-MMS information elements mapping

M-MMS information element	Reference
MMS-Generic-Header	The present document, A.1.1
Called-Party-Number	EN 300 175-5 [5], 7.7.7.
Called party Subaddress	EN 300 175-5 [5], 7.7.8.
Calling Party Number	EN 300 175-5 [5], 7.7.9.
Time-Date	EN 300 175-5 [5], 7.7.50
MMS-Obj-Header	The present document, A.1.2.
MMS-Ext-Header	The present document, A.1.3
Segmented Info	EN 300 175-5 [5], 7.7.37.
Repeat Indicator	EN 300 175-5 [5], 7.6.3

The user data M-MMS information element shall be mapped as follows:

Table A.3: M-MMS user data element mapping

M-MMS information element	NWK information element	Reference
User data	IWU-TO-IWU with <protocol discriminator> "M-MMS user data" user data is mapped into the IWU-TO-IWU-INFORMATION field	EN 300 175-5 [5], 7.7.23

A.3 Network layer segmentation rules for LRMS PTP

A.3.1 Procedure at the sending side

Upon receipt of a MNCC-IWU-INFO-req primitive the CC shall map the parameters into {IWU-INFO} message elements. The original message shall be segmented into two or more {IWU-INFO} messages by using the <<SEGMENTED-INFO>> element in the {IWU-INFO} message if the original message length exceeds 58 octets. For the segmentation procedure the elements defined mandatory in {IWU-INFO} message in EN 300 175-5 [5] shall be present in all messages and shall have the same value. The segmentation shall apply to the <<IWU-TO-IWU>> element only. Each message should contain the maximum amount of user data.

NOTE: This implies that other elements, such as the <<MMS-GENERIC-HDR>> and <<MMS-OBJECT-HDR>>, are not duplicated for subsequent {IWU-INFO} messages when segmentation is used.

The CC shall deliver the resulting {IWU-INFO} message (or series of messages) in sequence to the Link Control Entity (LCE) for immediate delivery via the connection oriented S-SAP (Service Access Point Identifier (SAPI) = "0"). The messages shall be delivered using DL-DATA-req primitives, indicating the use of a class A link.

A.3.2 Procedure at the receiving side

Upon receipt of a {IWU-INFO} message, the CC shall act as follows:

- a) if the message does not contain the <<SEGMENTED-INFO>> information element it shall map the elements into the parameters of a MNCC-IWU-INFO-ind primitive. It shall immediately issue the resulting primitive via the MNCC-SAP;
- b) if the message does contain the <<SEGMENTED-INFO>> element the CC shall store (buffer) this message. Whenever a new segmented message is received, the CC shall attempt to construct an original message using all stored segmented messages. Any duplicate segmented messages should be discarded.

The reconstructed original message shall be identified by the receipt of all of the segments as indicated in the <<SEGMENTED-INFO>> elements. Upon detection of a complete series of segments, the CC shall map the elements into the parameters of a MNCC-IWU-INFO-ind primitive. Duplicate mandatory elements and all <<SEGMENTED-INFO>> elements shall be discarded, and the individual <<IWU-TO-IWU>> elements shall be concatenated into a single message unit parameter. The CC shall immediately issue the resulting primitive via the MNCC-SAP.

Annex B (informative): Profile selection coding

This annex contains the basic coding used for selection of the type LRMS PTP service.

B.1 <<BASIC SERVICE>> coding

Table B.1: <<Basic service>> default coding

Octet	Information element field	Field value
2	<Call class> <Basic Service>	"Messaging Call Setup" "LRMS service" (NOTE)
NOTE: A different basic service is used for GSM SMS interworking.		

B.2 <<IWU-ATTRIBUTES>> coding

Table B.2: <<iwu attributes>> default coding

Octet	Information element field	Field value
3	<Coding standard> <Profile>	"Profile defined coding" "LRMS profile"
4	<Negotiation indicator> <Profile subtype>	Value depends on the implementation In case of SMS "SMS subprofile" (value 0000)

Rest of the codings are used for interworking service selection as defined in interworking annexes.

B.3 <<CONNECTION ATTRIBUTES>> coding

Table B.3: <<Connection attributes>> default coding

Octet	Information element field	Field value
3	<Symmetry> <Connection identity coding>	"Symmetric connection" "Unknown"
4	<Target number of bearers; P => F direction>	"No U-plane"
4b	<Target number of bearers; F => P direction>	"No U-plane"

The following table specifies the default call attribute and connection attribute values that apply for a call for which the CC-SETUP containing:

- value 4 (message call setup) within the <Message call setup> inside a <<Basic service>>;
- value 3 (LRMS profile) within the <Profile> inside a <<IWU attributes>>;
- value 0 (SMS) within the <Profile subtype> inside a <<IWU attributes>>.

Table B.4: Default coding for <<CALL-ATTRIBUTES>> information element

Octet	Information element field	Field Value
3	Coding standard	DECT standard
	Network layer attributes	Message call setup
4	C-plane class	Class A; shared
	C-plane transfer rate	C _S only

Other octets e.g. octet 5 and 6 which define the U-plane default values, are not applicable.

Table B.5: Default coding for <<CONNECTION-ATTRIBUTES>> information element

Octet	Information element field	Field Value
3	Symmetry	Symmetric connection
	Connection identity	Unknown/not applicable
4	Target bearers	No U-plane

Other octets e.g. octet 5 and 6 which define the U-plane default values, are not applicable.

Annex C (informative): Typical message mapping sequences

C.1 Summary of SMS-RP requirements

Although requirements concerning SMS-RP are outside the scope of the present document, the present document assumes that all SMS-RP messages as defined in ETS 300 559 [10] need to be supported. This concerns the following messages:

- RP-DATA: Transfer of message or notification;
- RP-ACK: Acknowledgement of RP-DATA;
- RP-SMMA: Indication that memory is again available for storing SMS messages;
- RP-ERROR: Indication that an error has occurred.

The scenario's provided in the following only show a number of typical sequences; it is no intended to describe all possible RP-message sequences.

C.2 Message sequences

This annex extends the description of the interworking functions related to the encapsulation of GSM- SMS RP messages by showing typical examples of possible mappings of SMS-RP messages onto MMSP and NWK-CC messages.

The following figures provide examples of message sequences. Please note that certain messages may be triggered by local primitives. There are no requirements concerning the use of these primitives; they are local and hence they do not affect interoperability. Therefore, they are not described in the MSC's.

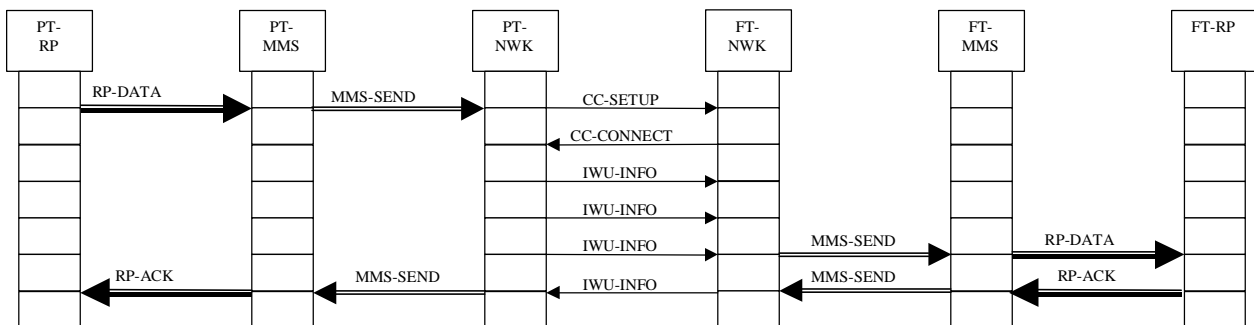


Figure C.1: Message mapping, PT- initiated message transfer

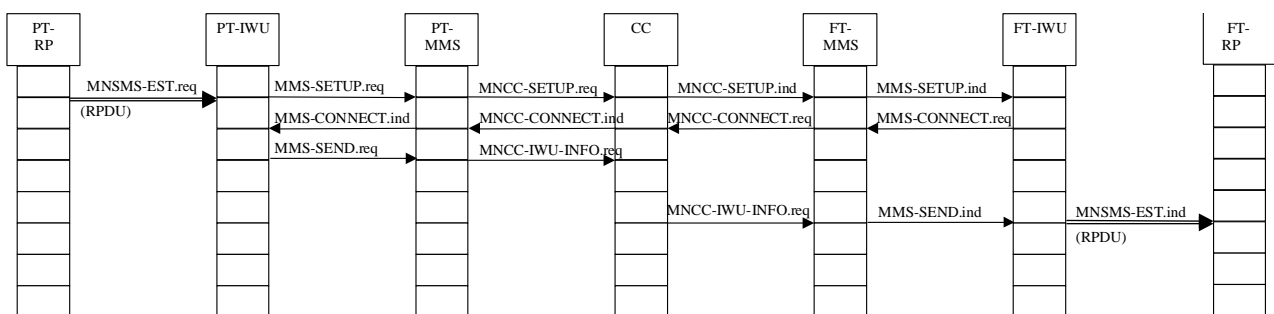


Figure C.2: Inter layer interaction, PT initiated messaging connection establishment example

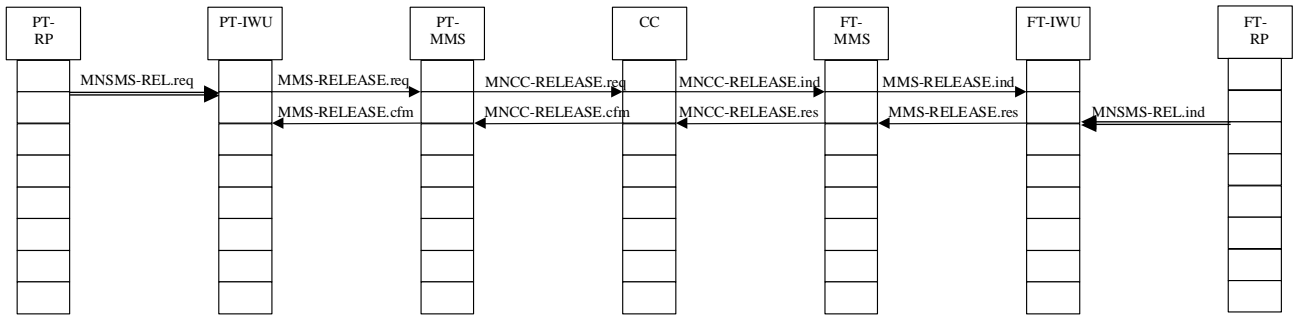


Figure C.3: Inter layer interaction, PT initiated messaging connection release example

Bibliography

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

ETSI EN 300 176: "Digital Enhanced Cordless Telecommunications (DECT); Approval test specification".

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

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

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

ETSI ETS 300 536: "European digital cellular telecommunications system (Phase 2); Technical realization of Short Message Service (SMS) Point-to-Point (PP) (GSM 03.40)".

History

Document history		
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