# ETSI EN 300 175-4 V2.9.1 (2022-03)

iTeh STANDARD
PREVIEW
(standards.iteh.ai)

**Digital Enhanced Cordless Telecommunications (DECT);**
**Common Interface (CI);**
**Part 4: Data Link Control (DLC) layer**

ETSI EN 300 175-4 V2.9.1 (2022-03)
https://standards.iteh.ai/catalog/standards/sist/f09040b9-3d86-40ae-8f55-d24e2d600c84/etsi-en-300-175-4-v2-9-1-2022-03

Reference
REN/DECT-00354

Keywords
DECT, DLC, IMT-2000, mobility, radio, TDD, TDMA

***ETSI***

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - APE 7112B
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° w061004871

***Important notice***

The present document can be downloaded from:
http://www.etsi.org/standards-search

iTeh STANDARD PREVIEW

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the prevailing version of an ETSI deliverable is the one made publicly available in PDF format at www.etsi.org/deliver.

Users of the present document should be aware that the document may be subject to revision or change of status.
Information on the current status of this and other ETSI documents is available at
https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx

(standards.iteh.ai)

If you find errors in the present document, please send your comment to one of the following services:
https://portal.etsi.org/People/CommiteeSupportStaff.aspx

ETSI EN 300 175-4 V2.9.1 (2022-03)
https://standards.iteh.ai/catalog/standards/sist/f09040b9-3d86-40ac-8f55-d24e2d600c84/etsi-en-300-175-4-v2-9-1-2022-03

If you find a security vulnerability in the present document, please report it through our
Coordinated Vulnerability Disclosure Program:
https://www.etsi.org/standards/coordinated-vulnerability-disclosure

***Notice of disclaimer & limitation of liability***

The information provided in the present deliverable is directed solely to professionals who have the appropriate degree of experience to understand and interpret its content in accordance with generally accepted engineering or other professional standard and applicable regulations.
No recommendation as to products and services or vendors is made or should be implied.
In no event shall ETSI be held liable for loss of profits or any other incidental or consequential damages.

Any software contained in this deliverable is provided "AS IS" with no warranties, express or implied, including but not limited to, the warranties of merchantability, fitness for a particular purpose and non-infringement of intellectual property rights and ETSI shall not be held liable in any event for any damages whatsoever (including, without limitation, damages for loss of profits, business interruption, loss of information, or any other pecuniary loss) arising out of or related to the use of or inability to use the software.

***Copyright Notification***

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.
The content of the PDF version shall not be modified without the written authorization of ETSI.
The copyright and the foregoing restriction extend to reproduction in all media.

© ETSI 2022.
All rights reserved.

# Contents

Intellectual Property Rights ..... 13
Foreword ..... 13
Modal verbs terminology ..... 13
1 Scope ..... 14
2 References ..... 14
2.1 Normative references ..... 14
2.2 Informative references ..... 15
3 Definition of terms, symbols and abbreviations ..... 16
3.1 Terms ..... 16
3.2 Symbols ..... 16
3.3 Abbreviations ..... 17
4 Data Link Control (DLC) layer overview ..... 19
4.1 General ..... 19
4.2 C-plane services ..... 20
4.3 U-plane services ..... 21
4.4 Lower Layer Management Entity (LLME) ..... 24
4.5 Instantiation in DLC U-plane ..... 24
5 C-plane service characteristics ..... 24
5.1 Data link service (LAPC+Lc) ..... 24
5.1.1 General ..... 24
5.1.2 LAPC types of operation ..... 25
5.1.3 Establishment of information transfer modes ..... 25
5.1.3.1 Data Link Identifier (DLI) ..... 25
5.1.3.2 LAPC states ..... 26
5.2 Broadcast service (Lb) ..... 26
6 Frame structures for C-plane services ..... 27
6.1 Data link service frame structure ..... 27
6.1.0 Frame format type FA ..... 27
6.1.1 General frame structure ..... 27
6.1.2 Lc frame delimiting and transparency ..... 28
6.1.3 Transmission order ..... 28
6.1.4 Routing to logical channels ..... 28
6.1.4.0 General ..... 28
6.1.4.1 $C_F$/$CL_F$ logical channel ..... 29
6.1.4.2 $C_S$/$CL_S$ logical channel ..... 29
6.1.5 Invalid frames ..... 29
6.2 Broadcast service frame structure ..... 30
6.2.1 Standard frame structure ..... 30
6.2.2 Extended frame structure ..... 30
7 Elements of procedures and formats of fields for C-plane peer-to-peer communication ..... 31
7.1 General ..... 31
7.2 Address field formats ..... 31
7.3 Address field parameters ..... 31
7.3.1 REServed bit (RES) ..... 31
7.3.2 Command Response (C/R) bit ..... 31
7.3.3 SAPI field ..... 31
7.3.4 New Link Flag (NLF) bit ..... 32
7.3.5 LLN-field ..... 32
7.3.6 Data Link Identifiers (DLI) ..... 32
7.4 Control field formats ..... 33
7.5 Control field parameters ..... 33
7.5.1 Poll/Final (P/F) bit ..... 33

iTeh STANDARD PREVIEW
(standards.iteh.ai)
ETSI EN 300 175-4 V2.9.1 (2022-03)
https://standards.iteh.ai/catalog/standards/sist/f09040b9-5d80-40ae-8155-d24e2d600e84/etsi-en-300-175-4-v2.9.1-2022-03

7.5.2 Multiple frame operation variables and sequence numbers ..... 33
7.5.2.1 Modulus ..... 33
7.5.2.2 Send state Variable V(S) ..... 34
7.5.2.3 Acknowledge state Variable V(A) ..... 34
7.5.2.4 Send sequence Number N(S) ..... 34
7.5.2.5 Receive state Variable V(R) ..... 34
7.5.2.6 Receive sequence Number N(R) ..... 34
7.5.3 Unacknowledged operation variables and sequence numbers ..... 34
7.5.4 Supervisory and Unnumbered function bits S and U ..... 34
7.6 Length indicator field format ..... 34
7.7 Length indicator field parameters ..... 35
7.7.1 Length indicator field extension bit (N) ..... 35
7.7.2 More data bit (M) ..... 35
7.7.3 Length parameter ($L_I$) ..... 35
7.7.4 Extended length parameter ($L_{JJ}$) ..... 36
7.7.5 Reserved bit (RES) ..... 36
7.8 Fill field format ..... 36
7.9 Checksum field format ..... 36
7.10 Checksum field parameters ..... 37
7.11 Commands and responses ..... 38
7.11.0 General ..... 38
7.11.1 Information (I) command ..... 38
7.11.2 Receive Ready (RR) command/response ..... 38
7.11.3 Receive Not Ready (RNR) command/response ..... 39
7.11.4 REJect (REJ) command/response ..... 39
7.11.5 Set Asynchronous Balanced Mode (SABM) command ..... 39
7.11.6 Disconnect Mode (DM) response ..... 39
7.11.7 Unnumbered Information (UI) command ..... 39
7.11.8 DISConnect (DISC) command ..... 40
7.11.9 Unnumbered ACK (UA) response ..... 40

8 Primitives ..... 40
8.1 Primitive types ..... 40
8.2 Primitives to the MAC layer (lower layer) ..... 40
8.3 Primitives to the NWK layer (higher layer) ..... 41
8.3.0 General ..... 41
8.3.1 Parameter definitions ..... 41
8.3.2 S-SAP primitives ..... 42
8.3.2.0 List of primitives ..... 42
8.3.2.1 DL_ESTABLISH primitive ..... 42
8.3.2.2 DL_RELEASE primitive ..... 43
8.3.2.3 DL_DATA primitive ..... 43
8.3.2.4 DL_UNIT_DATA primitive ..... 43
8.3.2.5 DL_SUSPEND primitive ..... 43
8.3.2.6 DL_RESUME primitive ..... 44
8.3.2.7 DL_ENC_KEY primitive ..... 44
8.3.2.8 DL_ENCRYPT primitive ..... 44
8.3.2.9 DL_SERVICE_MOD primitive ..... 45
8.3.3 B-SAP primitives ..... 45
8.3.3.0 List of primitives ..... 45
8.3.3.1 DL_BROADCAST primitive ..... 45
8.3.3.2 DL_EXPEDITED primitive ..... 45
8.4 Primitives to the interworking unit ..... 46
8.4.0 General ..... 46
8.4.1 Parameter definitions ..... 46
8.4.2 $LU_X$-SAP primitives ..... 46
8.4.2.0 List of primitives ..... 46
8.4.2.1 DL_U_DATA primitive ..... 46
8.4.2.2 DL_U_UNIT_DATA primitive ..... 47
8.4.2.3 DL_U_ERROR primitive ..... 47

9 C-plane peer-to-peer procedures ..... 47

iTeh STANDARD PREVIEW
(standards.iteh.ai)
ETSI EN 300 175-4 V2.9.1 (2022-03)
https://standards.iteh.ai/catalog/standards/sist/f09040b9-3d86-40ae-8f55-d24e2d600e84/etsi-en-300-175-4-v2.9.1-2022-03

9.1 General ..... 47
9.2 Point-to-point acknowledged operation ..... 48
9.2.1 Procedure for the use of the P/F bit ..... 48
9.2.1.1 Class A acknowledged information transfer ..... 48
9.2.1.2 Class B acknowledged information transfer ..... 48
9.2.2 Use of LLN ..... 48
9.2.2.1 Class A operation ..... 48
9.2.2.2 Class B operation ..... 48
9.2.3 Link establishment and information transfer in class A operation ..... 49
9.2.3.1 Establishing class A operation ..... 49
9.2.3.2 Class A acknowledged information transfer ..... 49
9.2.3.3 Transmission of class A I-frames ..... 50
9.2.3.4 Reception of class A I-frames ..... 50
9.2.3.5 Receiving acknowledgements ..... 50
9.2.3.6 Waiting for acknowledgement ..... 51
9.2.3.7 Release of class A operation ..... 51
9.2.3.8 Re-establishment of class A operation ..... 51
9.2.4 Establishing class B multiple frame operation ..... 52
9.2.4.1 Overview ..... 52
9.2.4.2 Class B multiple frame establishment procedures ..... 52
9.2.4.3 Class B LLN assignment procedures ..... 53
9.2.4.3.0 General ..... 53
9.2.4.3.1 PT establishment ..... 54
9.2.4.3.2 FT establishment ..... 54
9.2.5 Link maintenance and information transfer in class B multiple frame operation ..... 54
9.2.5.0 General ..... 54
9.2.5.1 Transmitting I-frames ..... 55
9.2.5.2 Receiving I-frames ..... 55
9.2.5.2.0 General ..... 55
9.2.5.2.1 P bit set to 1 ..... 55
9.2.5.2.2 P bit set to 0 ..... 55
9.2.5.3 Sending and receiving acknowledgements ..... 56
9.2.5.3.1 Sending acknowledgements ..... 56
9.2.5.3.2 Receiving acknowledgements ..... 56
9.2.5.4 Receiving REJ-frames ..... 56
9.2.5.5 Receiving RNR-frames ..... 57
9.2.5.6 LAPC own receiver busy condition ..... 58
9.2.5.7 Waiting acknowledgement ..... 59
9.2.5.8 Appropriate supervisory frame ..... 59
9.2.6 Release of class B multiple frame operation ..... 59
9.2.7 Link suspension and resumption ..... 60
9.2.7.1 Link suspension ..... 60
9.2.7.1.0 General ..... 60
9.2.7.1.1 Class B acknowledged suspend ..... 60
9.2.7.1.2 Unacknowledged suspend ..... 61
9.2.7.2 Class B link resumption ..... 62
9.2.7.3 Connection handover ..... 63
9.2.7.3.0 General ..... 63
9.2.7.3.1 Class A connection handover ..... 65
9.2.7.3.2 Class B connection handover ..... 65
9.2.7.3.3 Expiry of connection handover timer ..... 66
9.2.8 Re-establishment of class B multi-frame operation ..... 66
9.2.8.1 Criteria for re-establishment ..... 66
9.2.8.2 Procedure ..... 66
9.2.9 Exception handling ..... 67
9.2.9.1 General ..... 67
9.2.9.2 Class B exception condition reporting and recovery ..... 67
9.2.9.2.0 General ..... 67
9.2.9.2.1 N(S) sequence error ..... 67
9.2.9.2.2 N(R) sequence error ..... 68
9.2.9.2.3 Timer recovery condition ..... 68
9.2.9.2.4 Collision of identical transmitted and received commands ..... 68

iTeh STANDARD
PREVIEW
(standards.iteh.ai)
ETSI EN 300 175-4 V2.9.1 (2022-03)
https://standards.iteh.ai/catalog/standards/sist/f09040b9-3d86-40ae-8f55-d24e2d600c84/etsi-en-300-175-4-v2-9-1-2022-03

9.3 Unacknowledged operation ..... 68
9.3.1 Use of LLN for unacknowledged information transfer ..... 68
9.3.2 Class U link establishment ..... 68
9.3.3 Unacknowledged information transfer ..... 68
9.3.3.1 Transmission of unacknowledged information ..... 68
9.3.3.2 Reception of unacknowledged information ..... 68
9.3.4 Unacknowledged release ..... 69
9.4 Broadcast operation ..... 69
9.4.1 Normal operation ..... 69
9.4.1.1 Procedure in the Fixed radio Termination (FT) ..... 69
9.4.1.2 Procedure in the Portable radio Termination (PT) ..... 69
9.4.2 Expedited operation ..... 69
9.4.2.1 Procedure in the Fixed radio Termination (FT) ..... 69
9.4.2.2 Procedure in the Portable radio Termination (PT) ..... 70
9.5 MAC layer interfaces ..... 70
9.5.1 MC-SAP ..... 70
9.5.1.1 C-plane overview ..... 70
9.5.1.2 C-plane service data procedures ..... 70
9.5.1.3 U-plane service data ..... 71
9.5.2 MB-SAP ..... 71
9.5.2.0 General ..... 71
9.5.2.1 C-plane service data procedures ..... 71
9.5.2.2 U-plane service data ..... 72
9.5.3 MA-SAP ..... 72
9.5.3.1 Overview ..... 72
9.5.3.2 Service data procedures ..... 72

10 Management procedures ..... 72
10.1 Lower Layer Management Entity (LLME) ..... 72
10.2 MAC connection management ..... 73
10.2.0 General ..... 73
10.2.1 MAC connection set-up ..... 73
10.2.2 MAC connection release ..... 73
10.2.3 MAC connection modification ..... 74
10.2.4 MAC connection identifiers ..... 74
10.2.4.1 Overview ..... 74
10.2.4.2 Advanced MAC Connection Identifiers (AMCI) ..... 75
10.2.4.3 Basic MAC Connection Identifiers (BMCI) ..... 75
10.2.4.4 MAC Connection Endpoint Identifier (MCEI) ..... 75
10.2.5 Selection of logical channel ($C_S$ or $C_F$) ..... 75
10.3 DLC C-plane (LAPC) management ..... 76
10.3.0 General ..... 76
10.3.1 Provision of link signature ..... 76
10.3.2 Routing of connection oriented links ..... 77
10.3.3 Routing of connectionless links ..... 77
10.4 DLC U-plane (LUX) management ..... 77
10.4.0 General ..... 77
10.4.1 U-plane establishment ..... 77
10.4.2 U-plane release ..... 78
10.4.3 U-plane suspend and resume ..... 78
10.5 Connection handover management ..... 78
10.6 Ciphering management ..... 79
10.6.1 Ciphering management in cases where the NWK layer executes the ciphering related MM procedure ..... 79
10.6.1.0 General ..... 79
10.6.1.1 Providing a key to the MAC layer ..... 79
10.6.1.2 Starting and stopping the ciphering ..... 79
10.6.1.3 Connection handover ..... 79
10.6.2 Ciphering management in cases where the NWK layer does not execute the ciphering related MM procedure ..... 80
10.7 Broadband data link management ..... 80

11 U-plane service characteristics ..... 80

iTeh STANDARD PREVIEW
(standards.iteh.ai)
ETSI EN 300 175-4 V2.9.1 (2022-03)
https://standards.iteh.ai/catalog/standards/sist/f09040b9-3d86-40ae-8f55-d24e2d600e84/etsi-en-300-175-4-v2.9.1-2022-03

11.1 General ....80
11.2 LU1 TRansparent UnProtected service (TRUP) ....81
11.3 LU2 Frame RELay service (FREL) ....82
11.3.1 General ....82
11.3.2 Checksum operation ....83
11.3.3 Segmentation and transmission class ....83
11.3.4 Data transmission ....84
11.3.4.1 Send side procedure ....84
11.3.4.2 Receive side procedure ....84
11.4 LU3 Frame SWItching service (FSWI) ....84
11.5 LU4 Forward Error Correction (FEC) service ....85
11.6 LU5 Basic RATe adaption service (BRAT) ....85
11.6.1 Overview ....85
11.6.2 Protected service operation ....86
11.6.2.1 General ....86
11.6.2.2 Data buffering and initial rate adaptation ....87
11.6.2.3 Multi-channel set multiplexing ....88
11.6.2.4 Segmentation of Multiplexed Data Units (MDU) ....89
11.6.2.5 Frame sequencing and addition of control and fill octets ....90
11.6.2.6 Frame transmission ....91
11.6.3 Unprotected service operation ....91
11.6.3.1 General ....91
11.6.3.2 Data buffering and initial rate adaption ....92
11.6.3.3 Multi-channel set multiplexing ....92
11.6.3.4 Segmentation of MDUs ....93
11.6.3.5 Frame transmission ....93
11.7 LU6 Secondary RATe adaption (SRAT) service ....94
11.7.1 General ....94
11.8 LU16 ESCape Service (ESC) ....95
11.8.1 General ....95
11.9 LU7 64 kbit/s data bearer service ....95
11.9.1 General ....95
11.9.2 Physical layer service ....95
11.9.3 MAC layer service ....96
11.9.4 DLC layer service ....96
11.9.4.1 Architectural model ....96
11.9.4.1.0 General ....96
11.9.4.1.1 Transmit (Tx) frame buffering ....96
11.9.4.1.2 Receive (Rx) frame buffering ....96
11.9.4.2 Automatic-Repeat-Request (ARQ) and Forward Error Control (FEC) ....97
11.9.4.2.0 General ....97
11.9.4.2.1 Control field ....98
11.9.4.2.2 Information field ....100
11.9.4.2.3 ARQ checksum ....100
11.9.4.3 Procedures for normal operation ....101
11.9.4.3.0 General ....101
11.9.4.3.1 Establishment and synchronization procedures ....101
11.9.4.3.2 Active phase ....103
11.9.4.3.3 Release ....104
11.9.4.4 Exceptional procedures ....104
11.9.4.4.0 General ....104
11.9.4.4.1 Invalid frame condition ....104
11.9.4.4.2 Establishment ....105
11.9.4.4.3 Transmitting frames ....105
11.9.4.4.4 Receiving frames ....105
11.9.4.4.5 Sending acknowledgements ....105
11.9.4.4.6 Forwarding of received data ....105
11.9.4.4.7 N(R) sequence error ....105
11.9.4.4.8 N(O) sequence error ....105
11.9.4.4.9 N(S) sequence error ....106
11.9.4.4.10 Format error ....106
11.9.4.4.11 Abnormal release ....106

iTeh STANDARD
PREVIEW
(standards.iteh.ai)
ETSI EN 300 175-4 V2.9.1 (2022-03)
https://standards.iteh.ai/catalog/standards/sist/f09040b9-3d86-40ae-8f55-d24e2d600c84/etsi-en-300-175-4-v2-9-1-2022-03

11.9.4.4.12 Implicit reset ..... 106
11.9.5 Network layer service ..... 107
11.9.5.1 LCE service ..... 107
11.9.5.2 CC service ..... 107
11.10 LU8 service ..... 107
11.10.0 General ..... 107
11.10.1 Physical layer service ..... 107
11.10.2 MAC layer service ..... 107
11.10.3 DLC layer service ..... 107
11.11 LU9 - Unprotected Rate Adaption for V series Equipment (RAVE) Service ..... 108
11.11.1 Overview ..... 108
11.11.1.0 General ..... 108
11.11.1.1 FU9 frame structure ..... 108
11.11.1.1.1 General frame structure ..... 108
11.11.1.1.2 FU9 buffering procedures ..... 109
11.11.1.1.3 Connection handover ..... 109
11.11.1.1.4 Transmission order ..... 109
11.11.2 Alignment signal management ..... 109
11.11.2.1 General ..... 109
11.11.2.2 Procedures ..... 110
11.11.3 V.24 Signalling ..... 111
11.11.3.1 General ..... 111
11.11.3.2 Transmitter procedures ..... 111
11.11.3.3 Receiver procedures ..... 111
11.11.4 Rate Coding ..... 111
11.11.4.1 General ..... 111
11.11.4.2 Transmitter procedures ..... 112
11.11.4.3 Receiver procedures ..... 113
11.11.5 DECT Independent Clocking (DIC) ..... 113
11.11.5.1 General ..... 113
11.11.5.2 Measurement of phase differences ..... 113
11.11.5.3 Compensation control rules ..... 114
11.11.5.3.1 General ..... 114
11.11.5.3.2 Optimizing error resilience ..... 114
11.11.6 Information field ..... 115
11.11.6.1 General ..... 115
11.11.6.2 User data rates ..... 115
11.11.6.3 Information field filling rule ..... 116
11.11.7 Primitives ..... 116
11.12 LU10 Enhanced Frame RELay (EFREL) service ..... 117
11.12.1 General ..... 117
11.12.2 Segmentation and transmission class ..... 118
11.12.3 Data transmission ..... 118
11.12.3.1 Send side procedures ..... 118
11.12.3.1.0 General ..... 118
11.12.3.1.1 "Early transmission" option ..... 119
11.12.3.2 Receive side procedure ..... 119
11.12.3.2.0 General ..... 119
11.12.3.2.1 Standard SDU delivery mode ..... 119
11.12.3.2.2 In-sequence SDU delivery mode ..... 120
11.12.3.2.3 PDU-in-sequence delivery mode ..... 120
11.12.3.2.4 PDU-as-received delivery mode ..... 120
11.12.4 SDU boundaries definition ..... 120
11.12.4.0 General ..... 120
11.12.4.1 Infinite SDU mode ..... 121
11.12.5 Use over C/L downlink channels ..... 121
11.12.5.0 General ..... 121
11.12.5.1 Use over C/L downlink channels: unicast mode ..... 121
11.12.5.2 Use over C/L downlink channels: multicast mode ..... 121
11.12.5.2.0 General ..... 121
11.12.5.2.1 DLC acknowledgement in multicast mode ..... 121
11.13 LU11 service ..... 122

iTeh STANDARD
PREVIEW
(standards.iteh.ai)
ETSI EN 300 175-4 V2.9.1 (2022-03)
https://standards.iteh.ai/catalog/standards/sist/f09040b9-3d86-40ae-8f55-d24e2d600c84/etsi-en-300-175-4-v2-9-1-2022-03

11.13.0 General ..... 122
11.13.1 Physical layer service ..... 122
11.13.2 MAC layer service ..... 122
11.13.3 DLC layer service ..... 122
11.14 LU12 UNprotected Framed service (UNF) ..... 122
11.14.1 General ..... 122
11.14.2 DLC layer service ..... 122
11.14.2.0 General ..... 122
11.14.2.1 Segmentation ..... 123
11.14.2.2 Data transmission ..... 124
11.14.2.2.1 Send side procedure ..... 124
11.14.2.2.2 Receive side procedure ..... 124
11.15 LU13 Enhanced Frame RELay service with CRC (EFREL-CRC) ..... 125
11.15.1 General ..... 125
11.15.2 SDU CRC generation ..... 125
11.15.3 Use over C/L downlink channels ..... 125
11.15.3.0 General ..... 125
11.15.3.1 Use over C/L downlink channels: unicast mode ..... 126
11.15.3.2 Use over C/L downlink channels: multicast mode ..... 126
11.15.3.2.0 General ..... 126
11.15.3.2.1 DLC acknowledgement in multicast mode ..... 126
11.16 LU14 Enhanced Frame RELay service with CCM (EFREL-CCM) ..... 126
11.16.1 General ..... 126
11.16.2 LU14 SDU structure ..... 126
11.16.2.0 General ..... 126
11.16.2.1 SDU sizes ..... 127
11.16.2.2 Security model ..... 127
11.16.2.3 SDU processing ..... 127
11.16.2.4 Limitations ..... 128
11.16.2.5 CCM sequence numbers ..... 128
11.16.2.6 CCM control procedures ..... 128
11.16.3 Use over C/L downlink channels ..... 128
11.16.3.0 General ..... 128
11.16.3.1 Use over C/L downlink channels: unicast mode ..... 128
11.16.3.2 Use over C/L downlink channels: multicast mode ..... 129
11.16.3.2.0 General ..... 129
11.16.3.2.1 DLC acknowledgement in multicast mode ..... 129

12 Frame structures for U-plane services ..... 129
12.1 General ..... 129
12.2 FU1 frame structure ..... 130
12.2.1 General frame structure ..... 130
12.2.2 FU1 buffering procedures ..... 131
12.2.3 Minimum delay (speech) operation ..... 132
12.2.4 Connection handover ..... 132
12.2.5 Transmission order ..... 132
12.3 FU2 frame structure ..... 132
12.3.1 General frame structure ..... 132
12.3.2 FU2 buffering procedures ..... 133
12.3.3 Connection handover ..... 133
12.3.4 Transmission order ..... 133
12.4 FU3 frame structure ..... 133
12.4.1 General frame structure ..... 133
12.4.2 FU3 buffering procedures ..... 134
12.4.3 Connection handover ..... 135
12.4.4 Transmission order ..... 135
12.5 FU4 frame structure ..... 135
12.5.1 General frame structure ..... 135
12.5.2 FU4 buffering procedures ..... 136
12.5.3 Connection handover ..... 136
12.5.4 Transmission order ..... 136
12.6 FU5 frame structure ..... 136

iTeh STANDARD PREVIEW (standards.iteh.ai)
ETSI EN 300 175-4 V2.9.1 (2022-03)
https://standards.iteh.ai/catalog/standards/sist/f09040b9-3d86-40ae-8f55-d24e2d600c84/etsi-en-300-175-4-v2-9-1-2022-03

12.6.1 General frame structure ....136
12.6.2 FU5 buffering procedures ....137
12.6.3 Connection handover ....138
12.6.4 Transmission order ....138
12.7 FU6 frame structure ....138
12.7.1 General frame structure ....138
12.7.2 FU6 buffering procedures ....139
12.7.3 Connection handover ....139
12.7.4 Transmission order ....139
12.8 FU7 frame structure ....139
12.9 FU8 frame structure ....139
12.10 FU9 frame structure ....139
12.11 FU10 frame structure ....140
12.11.1 General frame structure ....140
12.11.1.0 General ....140
12.11.1.1 Specific for MAC service $I_{PK}$ ....142
12.11.2 Transmission of FU10c and FU10d frames ....143
12.11.2.0 General ....143
12.11.2.1 Insertion of the FU10c frame in an FU10a frame of the opposite link ....143
12.11.2.2 Transmission of the F10c frame using the $G_F$ channel ....143
12.11.2.3 Insertion of the FU10d frame in an FU10a frame of the opposite link ....144
12.11.2.4 Transmission of the FU10d frame using the $G_{FA}$ channel ....144
12.11.3 FU10 buffering procedures ....144
12.11.4 Connection handover ....144
12.11.5 Transmission order ....144
12.12 FU12 frame structure ....145
12.12.1 General frame structure ....145
12.12.2 FU12 buffering procedures ....145
12.12.3 Connection handover ....146
12.12.4 Transmission order ....146

13 Elements of procedures and formats of fields for U-plane peer-to-peer communication ....146
13.1 General ....146
13.2 Address elements ....146
13.2.1 Address field format ....146
13.2.2 Address field parameters ....147
13.3 Length indicator elements ....147
13.3.1 Length indicator field format ....147
13.3.1.1 Length indicator field format for all services except LU10 ....147
13.3.1.2 Length indicator field format for service LU10 ....147
13.3.2 Length indicator field parameters ....148
13.3.2.1 Length indicator field parameters for all services except LU10 ....148
13.3.2.2 Length indicator field parameters for LU10 service ....149
13.3.2.2.0 General ....149
13.3.2.2.1 Meaning of the more (M) bit ....151
13.4 Sequence number elements ....152
13.4.1 Send sequence number format ....152
13.4.2 Send sequence number parameters ....152
13.4.3 Receive sequence number format ....152
13.4.4 Receive sequence number parameters ....153
13.5 Fill elements - Fill field format ....153

14 U-plane peer-to-peer procedures ....153
14.1 General ....153
14.2 Frame transmission principles ....153
14.2.1 Sequence numbering ....153
14.2.2 Acknowledgements ....154
14.2.2.1 Sending acknowledgements ....154
14.2.2.2 Receiving acknowledgements ....154
14.2.3 Transmission classes ....154
14.2.3.0 General ....154
14.2.3.1 Class 0: No $LU_X$ retransmission or sequencing ....154

iTeh STANDARD
PREVIEW
(standards.iteh.ai)
ETSI EN 300 175-4 V2.9.1 (2022-03)
https://standards.iteh.ai/catalog/standards/sist/f09040b9-3d8c-40ec-8f55-d24e2d600c84/etsi-en-300-175-4-v2-9-1-2022-03

14.2.3.2 Class 1: no $LU_X$ retransmission....155
14.2.3.2.0 General....155
14.2.3.2.1 Class 1: use over C/L downlink channels....155
14.2.3.3 Class 2: variable throughput, limited delay $LU_X$ retransmission....155
14.2.3.4 Class 3: fixed throughput $LU_X$ retransmission....156
14.2.4 Operation parameter negotiation....156
14.3 Frame transmission procedures....156
14.3.1 General....156
14.3.2 Class 0 procedures....156
14.3.2.0 General....156
14.3.2.1 Sending side procedure....157
14.3.2.2 Receiving side procedure....157
14.3.3 Class 1 procedures....157
14.3.3.0 General....157
14.3.3.1 Sending side procedure....157
14.3.3.2 Receiving side procedure....158
14.3.4 Class 2 procedures....158
14.3.4.0 General....158
14.3.4.1 Sending side procedure....158
14.3.4.1.0 General....158
14.3.4.1.1 Synchronization message sending side procedure (LU10)....160
14.3.4.1.2 Tx side end-of-activity rule....160
14.3.4.1.3 Abnormal SDU termination/abort signal (LU10 only)....161
14.3.4.1.4 Retransmission procedure....162
14.3.4.2 Receiving side procedure....162
14.3.4.2.0 General....162
14.3.4.2.1 Acknowledgement procedure....162
14.3.4.2.2 Rx side end-of-activity rule....164
14.3.4.2.3 Retransmission request procedure....164
14.3.4.2.4 SDU delivery procedure....165
14.3.4.2.5 Synchronization message receiver side procedure (LU10)....165
14.3.4.2.6 Reception of an abnormal SDU termination/abort signal (LU10)....166
14.3.5 Class 3 procedures....166
14.3.5.0 General....166
14.3.5.1 Sending side procedure....166
14.3.5.2 Receiving side procedure....167

**Annex A (normative): System parameters....169**

A.1 LAPC timer values....169

A.2 U-plane timer values....170

A.3 Constants....170
A.3.1 Retransmission counter (N250)....170
A.3.2 Maximum number of CHO attempts (N251)....170

**Annex B (normative): Checksum algorithms....171**

B.1 Arithmetic conventions....171

B.2 Coding algorithm....171

B.3 Decoding algorithm....171

B.4 Some examples....172

**Annex C (informative): MAC connection states....173**

**Annex D (normative): Mapping of agreed channel rates to MCS sizes....174**

D.0 General....174

D.1 Protected class operation....174

D.2 Unprotected class operation....175

iTeh STANDARD PREVIEW (standards.iteh.ai)
ETSI EN 300 175-4 V2.9.1 (2022-03)
https://standards.iteh.ai/catalog/standards/sist/f09040b9-3d8c-40ae-8f55-d24e2d600c84/etsi-en-300-175-4-v2-9-1-2022-03

**Annex E (normative): LU12 applications ..... 176**

E.1 G.729.1 over 32 kbit/s channel ..... 176
E.1.0 General ..... 176
E.1.1 G.729.1 payload format ..... 176
E.1.1.0 General ..... 176
E.1.1.1 G.729.1 payload header coding ..... 177
E.1.2 Operations ..... 179
E.1.2.1 Encoder bit rate ..... 179
E.1.2.2 Protection against random errors ..... 179

**Annex F (informative): Bibliography ..... 180**

**Annex G (informative): Change history ..... 181**

History ..... 182

iTeh STANDARD
PREVIEW
(standards.iteh.ai)

ETSI EN 300 175-4 V2.9.1 (2022-03)
https://standards.iteh.ai/catalog/standards/sist/f09040b9-3d86-40ae-8f55-d24e2d600c84/etsi-en-300-175-4-v2-9-1-2022-03

# Intellectual Property Rights

## Essential patents

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

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

## Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

**DECT™**, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members. **3GPP™** and **LTE™** are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners. **oneM2M™** logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners. **GSM**® and the GSM logo are trademarks registered and owned by the GSM Association.

iTeh STANDARD
PREVIEW
(standards.iteh.ai)

# Foreword

This European Standard (EN) has been produced by ETSI Technical Committee Digital Enhanced Cordless Telecommunications (DECT).

ETSI EN 300 175-4 V2.9.1 (2022-03)
https://standards.iteh.ai/catalog/standards/sist/f09040b9-5d80-40ae-8155-d24e2d60fe84/etsi-en-300-175-4-v2.9.1-2022-03

The present document is part 4 of a multi-part deliverable ([1] to [8]). Full details of the entire series can be found in part 1 [1].

Further details of the DECT system may be found in ETSI TR 101 178 [i.1] and ETSI ETR 043 [i.2].

| National transposition dates | |
|---|---|
| Date of adoption of this EN: | 23 March 2022 |
| Date of latest announcement of this EN (doa): | 30 June 2022 |
| Date of latest publication of new National Standard or endorsement of this EN (dop/e): | 31 December 2022 |
| Date of withdrawal of any conflicting National Standard (dow): | 31 December 2023 |

# Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

# 1 Scope

The present document is one of the parts of the specification of the Digital Enhanced Cordless Telecommunications (DECT) Common Interface (CI).

The present document specifies the Data Link Control (DLC) layer. The DLC layer is part 4 of the DECT CI standard and layer 2b of the DECT protocol stack.

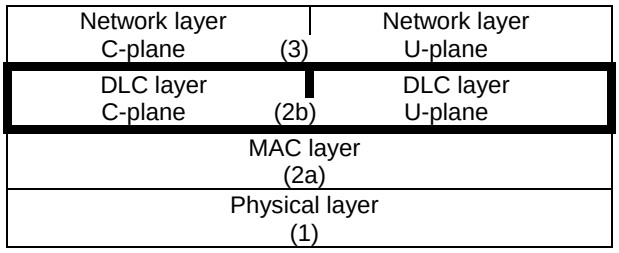


**Figure 1.1**

Two planes of operation are specified for this DLC (sub)layer. These planes are called the Control plane (C-plane) and the User plane (U-plane).

The C-plane is mostly concerned with the DECT signalling aspects. It provides a reliable point-to-point service that uses a link access protocol to offer error protected transmission of Network (NWK) layer messages. The C-plane also provides a separate point-to-multipoint (broadcast) service (Lb).

iTeh STANDARD PREVIEW (standards.iteh.ai)

The U-plane is only concerned with end-to-end user information. This plane contains most of the application dependent procedures of DECT. Several alternative services (both circuit-mode and packet-mode) are defined as a family of independent entities. Each service provides one or more point-to-point U-plane data links, where the detailed characteristics of those links are determined by the particular needs of each service. The defined services cover a wide range of performance, from "unprotected with low delay" for speech applications to "highly protected with variable delay", for local area network applications.

NOTE: The performance of the DLC services need not be tight to any particular application. For example the "unprotected with low delay" service could also be used for data applications, e.g. if some data protection is provided outside the DECT protocol.

ETSI EN 300 175-4 V2.9.1 (2022-03)
https://standards.iteh.ai/catalog/standards/sist/f09040b9-3d86-40a5-8155-d24c2d600c84/etsi-en-300-175-4-v2-9-1-2022-03

The present document uses the layered model principles and terminology as described in Recommendations ITU-T X.200 [14] and X.210 [15].

The present document includes New Generation DECT, a further development of the DECT standard introducing wideband speech, improved data services, new slot types and other technical enhancements.

# 2 References

## 2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at https://docbox.etsi.org/Reference/.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

[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] Void.

[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 and audio coding and transmission".

[9] ETSI TS 144 006: "Digital cellular telecommunications system (Phase 2+) (GSM); Mobile Station - Base Station System (MS - BSS) interface; Data Link (DL) layer specification (3GPP TS 44.006)".

[10] Recommendation ITU-T Q.920: "ISDN user-network interface data link layer - General aspects".

[11] Recommendation ITU-T Q.921: "ISDN user-network interface - Data link layer specification".

[12] Recommendation ITU-T V.42: "Error-correcting procedures for DCEs using asynchronous-to-synchronous conversion".

[13] Recommendation ITU-T V.110: "Support by an ISDN of data terminal equipments with V-Series type interfaces".

[14] Recommendation ITU-T X.200: "Information technology - Open Systems Interconnection - Basic Reference Model: The basic model".

[15] Recommendation ITU-T X.210: "Information technology - Open Systems Interconnection - Basic Reference Model: Conventions for the definition of OSI services".

[16] ISO/IEC 8073: "Information technology -- Open Systems Interconnection -- Protocol for providing the connection-mode transport service".

[17] ETSI EN 301 649: "Digital Enhanced Cordless Telecommunications (DECT); DECT Packet Radio Service (DPRS)".

[18] National Institute of Standards and Technology (NIST) FIPS Publication 197 (2001): "Advanced Encryption Standard (AES)".

[19] IETF RFC 3610: "Counter with CBC-MAC (CCM)".

## 2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

iTeh STANDARD PREVIEW (standards.iteh.ai)
ETSI EN 300 175-4 V2.9.1 (2022-03)
https://standards.iteh.ai/catalog/standards/sist/f0904069-3d86-40ae-8f55-d24e2d600c84/etsi-en-300-175-4-v2-9-1-2022-03