



**Digital Enhanced Cordless Telecommunications (DECT);
Ultra Low Energy (ULE);
Machine to Machine Communications;
Part 2: Home Automation Network (phase 2)**

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4553-9489-86674b9621bc/etsi-102-939-2-v1-2-1-2017-10*

Reference

RTS/DECT-ULE273

Keywords

access, data, DECT, environment, IMT-2000,
intelligent homes & buildings, internet,
interoperability, interworking, M2M, mobility,
packet mode, profile, radio, synchronization,
TDD, TDMA**ETSI**

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Contents

Intellectual Property Rights	9
Foreword.....	9
Modal verbs terminology.....	9
Introduction	10
1 Scope	11
2 References	11
2.1 Normative references	11
2.2 Informative references.....	12
3 Definitions, symbols and abbreviations	13
3.1 Definitions.....	13
3.2 Symbols.....	13
3.3 Abbreviations	14
4 Description of services and features.....	16
4.1 DECT Ultra Low Energy	16
4.1.0 General.....	16
4.1.1 Back-compatibility with ULE Phase 1.....	17
4.1.2 Coexistence with other DECT services	17
4.1.3 Example applications covered by ULE Phase 2	17
4.1.3.0 General	17
4.1.3.1 Simple medical pendant alarms.....	17
4.1.3.2 Software Upgrade Over The Air	18
4.1.3.3 M2M devices with audio capability	18
4.2 Requirements for ULE Phase 2	19
4.2.1 Device types.....	19
4.2.1.0 General	19
4.2.1.1 ULE Phase 2 RFP	19
4.2.1.1.1 General description.....	19
4.2.1.1.2 Requirements.....	19
4.2.1.2 PP type IV: hybrid device with voice/data support	19
4.2.1.2.1 General description.....	19
4.2.1.2.2 Requirements	19
4.2.2 U-plane interworking and protocol architecture	19
4.2.3 Performance Objectives	20
4.3 Services and features implemented by ULE phase 2.....	20
4.3.0 General.....	20
4.3.1 MAC/PHY layer	20
4.3.2 DLC layer	20
4.3.3 NWK layer.....	20
4.3.4 Interworking and Application layer	21
4.3.5 Security	21
4.3.6 Management Entity.....	21
4.3.7 Speech services and codecs	21
5 Service and feature definitions	21
5.1 ULE Phase 2.....	21
5.1.1 PHL service definitions	21
5.1.2 MAC service definitions	21
5.1.3 DLC service definitions	22
5.1.4 NWK feature definitions.....	22
5.1.5 Application feature definitions	23
5.1.6 Management Entity (ME) definitions	23
5.1.7 U-plane service and interworking definitions	23
5.1.8 ULE device types.....	23
5.1.9 Speech services and speech coding definitions.....	23

5.1.10	Call Control (CC) and mobility management service definitions	24
6	Profile specific requirements	24
6.1	General	24
6.2	Specific conventions.....	24
6.2.1	Use of symbols in support status tables	24
6.3	DECT ULE phase 1 device types	24
6.3.1	Types of devices supported by the present document.....	24
6.3.2	Specific procedures for specific device types	25
6.4	Physical layer (PHL) requirements.....	25
6.4.1	Physical layer (PHL) services	25
6.4.2	Modulation schemes	25
6.4.3	PHL service to procedure mapping.....	26
6.5	MAC layer requirements	26
6.5.1	MAC layer services	26
6.5.2	MAC service to procedure mapping	27
6.6	DLC layer	29
6.6.1	DLC layer services.....	29
6.6.2	DLC service to procedure mapping	30
6.7	NWK layer	31
6.7.1	General.....	31
6.7.2	NWK features	31
6.7.3	NWK features to procedures mapping.....	33
6.8	Application Layer.....	34
6.8.1	Application features	34
6.8.2	Application features to procedures mapping.....	35
6.9	Distributed communications.....	35
6.10	Management Entity (ME).....	35
6.10.1	Management Entity (ME) services	35
6.10.2	Management Entity (ME) mode to procedures mapping	36
6.11	U-plane services and interworking requirements	37
6.11.1	U-plane and interworking services	37
6.11.2	U-plane and interworking service to procedure mapping	37
6.12	Speech Services.....	38
6.12.1	Speech Services features.....	38
6.12.2	Speech Services to procedures mapping	38
6.13	General class/service/interworking support.....	39
6.13.1	Class/service support	39
6.13.2	Protocol interworking support	39
7	Profile specific procedures description	40
7.0	General	40
7.1	Back compatibility with ULE Phase 1	40
7.1.0	General.....	40
7.1.1	Back compatibility with a ULE Phase 1 Fixed Part (FP).....	40
7.1.2	Back compatibility with a ULE Phase 1 Portable Part (PP)	40
8	Physical Layer (PHL) procedures	40
9	Management Entity (ME) procedures	40
9.1	ULE phase 1 Management	40
9.2	Channel selection and collision avoidance procedures.....	40
9.3	Channel selection and collision avoidance procedures for US region.....	41
9.3.0	General.....	41
9.3.1	Overall architecture of ULE channel selection processes.....	41
9.3.2	Process M0 (RFP side pre-selection process)	41
9.3.3	Broadcast mechanism	41
9.3.4	Process M1 (PP side channel selection process).....	42
9.3.5	Setup attempt and evaluation of responses	42
9.3.6	Process M2 (collision handling/collision avoidance process).....	43
9.4	Channel selection and collision avoidance procedures for Japan region.....	43
9.4.0	General.....	43
9.4.1	Overall architecture of ULE channel selection processes.....	43

9.4.2	Process M0 (RFP side pre-selection process)	43
9.4.3	Broadcast mechanism	44
9.4.4	Process M1 (PP side channel selection process).....	44
9.4.5	Setup attempt and evaluation of responses	44
9.4.6	Process M2 (collision handling/collision avoidance process).....	45
10	MAC layer procedures	45
10.1	Radio Control Bits.....	45
10.1.1	Quiet Channel Indication	45
10.1.2	PHS Detection Indication	45
10.2	Downlink broadcast (A-field).....	46
10.2.0	General.....	46
10.2.1	N_T messages.....	46
10.2.2	Q_T messages.....	46
10.2.2.1	Q_T - static system information.....	46
10.2.2.2	Q_T - FP capabilities	46
10.2.2.2.1	Standard FP Capabilities	46
10.2.2.2.2	Extended FP Capabilities.....	47
10.2.2.2.3	Extended FP Capabilities part 2	48
10.3	Slot types and slot use	48
10.3.1	Full Slot	48
10.3.1.1	General	48
10.3.1.2	Use of full slot in C/O bearers.....	48
10.3.1.3	Use of full slot in C/L dummy bearers	48
10.3.2	Short Slot	48
10.3.2.1	General	48
10.3.2.2	Use of short slot in C/O bearers	49
10.3.3	Long Slot	49
10.3.3.1	General	49
10.3.3.2	Use of long slot in C/O bearers	49
10.4	No-emission legacy mode procedures.....	49
10.4.1	General.....	49
10.5	U-plane C/L downlink services.....	50
10.5.0	General.....	50
10.5.1	U-plane C/L downlink multicast unacknowledged service.....	50
10.5.1.0	General	50
10.5.1.1	Logical channels and instance separation	50
10.5.1.2	Addressing and management of multicast groups	50
10.5.1.3	Procedure	50
10.5.1.4	SI _P subfield format	50
10.5.2	U-plane C/L downlink over the dummy bearer	50
10.5.2.0	General	50
10.5.2.1	Multiplexing cycle	51
10.5.2.2	Single-burst transmission	51
10.5.2.3	Identification of C/L downlink insertion.....	51
10.5.2.4	Announcement via the B _U paging channel and identification of instances	51
10.5.3	U-plane C/L downlink over additional C/L bearers.....	51
10.5.3.0	General	51
10.5.3.1	Channel selection and transmission start.....	52
10.5.3.2	MAC signalling in the additional C/L downlink bearer	52
10.5.3.3	Single-burst transmission	52
10.5.3.4	Announcement via the B _U paging channel and identification of instances	52
10.5.4	Repetition of U-plane C/L downlink	53
10.6	ULE Paging Procedures (phase 2).....	53
10.6.0	General.....	53
10.6.1	P _U Paging Message Formats	53
10.6.2	Paging Descriptors for ULE Paging	54
10.6.2.1	Basic concepts of the ULE paging system	54
10.6.2.2	Basic operation of the descriptors	54
10.6.2.3	Allocation of descriptors	54
10.6.2.4	Format for descriptors in ULE phase 1	54

10.6.2.4.0	General	54
10.6.2.4.1	Master/slave types	55
10.6.2.4.2	CA subscription capability	55
10.6.2.4.3	Format A.....	55
10.6.2.4.4	Format B.....	56
10.6.2.4.5	Format C.....	57
10.6.2.5	Descriptors in ULE phase 2	58
10.6.2.5.1	Descriptor codes	58
10.6.2.5.2	Descriptor detailed descriptions	58
10.6.2.5.3	Additional conventions for ULE phase 2 descriptors	60
10.6.2.5.4	Coding of additional C/L bearer position	60
10.6.2.5.5	Discrimination between multicast transmissions over the dummy and over additional C/L bearers	61
10.6.2.5.6	Time references for multicast transmissions	61
10.6.3	CA mask mechanism	61
10.7	Repeater compatibility procedures	61
10.7.1	General.....	61
10.7.2	Identification of a WRS	62
10.7.3	ULE page delay mechanism	62
10.7.4	Roaming.....	63
10.7.4.1	General	63
10.7.4.2	Regular DECT roaming	63
10.7.4.3	ULE roaming.....	63
10.7.4.4	ULE bearer replacement (inter-cell).....	64
10.8	Additional requirements for I channel services	64
10.8.1	Lifetime management with TWO separate maximum MAC packet lifetimes	64
10.8.1.0	General	64
10.8.1.1	Operation of the counters	65
10.9	U-NEMo mode procedures.....	65
10.9.1	General.....	65
10.9.2	Entering U-NEMo mode.....	65
10.9.3	Behaviour during U-NEMo mode	66
10.9.4	ULE device initiated interaction	66
10.9.4.1	ULE device requests that the base raise a ULE dummy bearer.....	66
10.9.4.2	ULE device initiated interaction when a dummy exists	67
10.9.5	FT initiated interaction.....	67
10.9.5.1	Interaction with ULE devices only.....	67
10.9.5.2	Interaction with ULE devices which also wakes NEMo handsets	68
10.9.6	NEMo handset initiated interaction	68
10.9.7	Leaving U-NEMo mode	68
10.9.8	U-NEMo and ULE paging	68
10.9.8.1	General	68
10.9.8.2	Multicast paging.....	68
10.9.8.3	Relaxed paging.....	68
11	DLC layer procedures	69
11.1	Specific procedures for C/L downlink multicast channels	69
11.1.1	Procedures for C/L downlink multicast channels	69
11.1.1.1	LU14 Enhanced Frame RELay service with CCM (EFREL-CCM) for C/L downlink multicast channels.....	69
11.1.1.2	LU13 Enhanced Frame RELay service with CRC (EFREL-CRC) for C/L downlink multicast channels.....	69
11.1.1.2.0	General	69
11.1.1.2.1	Use of LU13 in multicast links.....	70
11.1.1.3	LU10 Enhanced Frame RELay service (EFREL) for C/L downlink multicast channels	70
11.1.1.4	FU10a frame operation for C/L downlink multicast channels	70
11.1.1.5	Transmission Class 1 over C/L downlink multicast channels.....	70
11.1.2	Security procedures for C/L downlink multicast channels	70
11.1.2.1	CCM Authenticated Encryption of C/L downlink multicast channels.....	70
11.1.2.2	Initialization Vector for multicast channels	70
11.1.2.3	Security provisions regarding the key for multicast channels.....	71

12	NWK layer procedures.....	71
12.1	Specific procedures for C/L downlink multicast channels	71
12.1.1	Security procedures for C/L downlink multicast channels	71
12.1.1.1	Cipher keys for CCM encryption of C/L multicast channels	71
12.1.1.2	Multicast encryption parameter assignment procedure, FT initiated	71
12.1.1.2.0	General	71
12.1.1.2.1	Procedure description	71
12.1.1.2.2	Security provision.....	71
12.1.1.2.3	Coding of the operation messages	71
12.1.1.3	Multicast encryption parameter retrieval procedure, PT initiated	74
12.1.1.3.0	General	74
12.1.1.3.1	Procedure description	74
12.1.1.3.2	Security provisions	74
12.1.1.3.3	Coding of the operation messages	75
12.1.2	Control procedures for C/L downlink multicast channels	77
12.1.2.1	Subscription to C/L downlink multicast channels.....	77
12.1.2.2	Activation of security procedures	77
12.1.2.3	Un-subscription to C/L downlink multicast channels	77
12.1.2.4	Parameters for the C/L downlink multicast service	77
12.2	Terminal capabilities and FP broadcasts	78
12.2.1	Terminal capability indication	78
12.2.2	FP broadcasts	79
12.2.2.1	Higher layer information FP broadcast	79
12.2.2.1.0	General	79
12.2.2.1.1	Higher layer information in standard FP broadcast (Qh = 3).....	80
12.2.2.1.2	Higher layer information in Extended FP broadcast (Qh = 4).....	80
12.2.2.1.3	Extended Higher Layer capabilities part 2 (Qh = 11).....	80
12.3	Specific procedures for "hybrid" devices	81
12.3.1	Incoming calls for "hybrid voice" devices	81
12.3.1.1	General requirements	81
12.3.1.2	Paging descriptors for incoming calls	82
12.3.1.3	Incoming call procedure.....	82
12.3.2	Interactions of ULE and "circuit mode".....	83
12.3.2.1	General requirements	83
12.3.2.2	ULE request whilst "circuit mode" active.....	83
12.3.2.3	"Circuit mode" request whilst ULE active	83
12.3.2.4	Suspend/resume ULE service.....	84
12.4	SUOTA push mode	84
12.4.1	General requirements.....	84
12.4.2	Paging descriptors for SUOTA push mode.....	84
12.4.3	Push mode procedure.....	84
12.5	Additional requirements for ULE NWK Control	84
12.5.1	Default ULE PVC transaction parameters	84
12.5.2	Default MAC parameters for implicitly created MBC.....	85
12.6	U-NEMo procedures	85
12.6.1	Communication of U-NEMo preferred carrier	85
13	Services and Interworking procedures	85
13.1	Specific procedures for ULE phase 2.....	85
13.1.1	Service channels transported via <<IWU-to-IWU>> IE	85
13.1.1.1	General concepts	85
13.1.1.2	Configuration and control service channel.....	86
13.1.1.2.0	General	86
13.1.1.2.1	ULE Common Control Protocol procedures	86
13.1.1.3	CCM encrypted general purpose service channel	86
13.1.1.3.0	General	86
13.1.1.3.1	Services provided by the DECT sub-system	87
13.1.1.3.2	Transport of the general purpose service channel.....	87
13.1.1.3.3	Security procedures	88
13.1.1.3.4	Segmentation and reassembling	88
13.1.1.3.5	MAC Release Reason Emulation	89
13.1.2	IWU procedures for C/L downlink multicast service	90

13.1.2.1	General	90
13.1.2.2	U-plane procedures	91
13.1.2.3	C-plane procedures.....	91
14	Application procedures.....	91
14.1	Hybrid device voice service	91
14.1.0	Introduction.....	91
14.1.1	General requirements.....	91
14.2	Hybrid device data service	91
14.2.0	Introduction.....	91
14.2.1	General requirements.....	91
14.3	Software Upgrade Over The Air (SUOTA) for ULE devices	92
14.3.0	Introduction.....	92
14.3.1	General requirements.....	92
Annex A (normative): Parameters and Information Elements.....		93
A.1	Constants, variables and operating parameters	93
A.1.1	Operating parameters	93
A.1.1.1	Channel selection algorithms.....	93
A.1.1.2	MAC layer	93
A.1.1.3	DLC layer	93
History		94

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Digital Enhanced Cordless Telecommunications (DECT).

The present document is based on ETSI EN 300 175 parts 1 [1] to 8 [8], ETSI EN 300 444 [9], ETSI EN 301 649 [16] and ETSI TS 102 939-1 [12].

The present document has been developed in accordance to the rules of documenting a profile specification as described in ISO/IEC 9646-6 [i.1].

The present document is part 2 of a multi-part deliverable covering Machine to Machine Communications based on DECT Ultra Low Energy (ULE), as identified below:

Part 1: "Home Automation Network (phase 1)";

Part 2: "Home Automation Network (phase 2)".

Further phases with additional functionality may be defined in the future by other parts of this multi-part deliverable.

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).

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Introduction

DECT Ultra Low Energy (ULE) is based on the DECT base standard ETSI EN 300 175 parts 1 [1] to 8 [8], and the DECT Packet Radio Service (DPRS) ETSI EN 301 649 [16]. However, DECT ULE includes substantial differences from its parent technology in order to achieve Ultra Low Power consumption.

From the point of view of DECT standardization DECT ULE is an Application Profile (AP) based on the DECT base standard (ETSI EN 300 175, parts 1 [1] to 8 [8]). This application profile may reuse definitions and procedures defined in other DECT applications profiles when needed or convenient. This is the case, for instance, of the DECT Generic Access Profile (GAP) ETSI EN 300 444 [9], the DECT Packet Radio Service (DPRS) ETSI EN 301 649 [16] and DECT Ultra Low Energy (ULE) Part 1 [12].

All DECT devices claiming to be compliant with this Application Profile will offer at least the basic services defined as mandatory. In addition to that, optional features can be implemented to offer additional DECT ULE services.

The aim of the DECT ULE standard is to guarantee a sufficient level of interoperability and to provide an easy route for development of DECT ULE applications. The DECT ULE standard also guarantees compatibility between DECT ULE applications and existing DECT applications (such as GAP or NG-DECT) running over the same spectrum and even in the same device.

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1 Scope

The present document covers the following DECT ULE services and features:

- Back-compatibility with ULE Phase 1 [12].
- Regional variants of ULE for US and Japan.
- Support for hybrid devices which utilize ULE and non-ULE services (such as voice).
- Software Update Over The Air (SUOTA), compatible with the same feature as defined in New Generation DECT Part 4 [13].
- Compatibility mode for FTs that also support No-Emissions Mode (NEMo [13]).
- Connectionless Downlink, which is the capability to transmit ULE messages to multiple devices.
- Repeater compatibility support for FP and PP.

The set of DECT ULE services and features defined in the present document is named "Home Automation Network (phase 2)", and is primarily targeted to provide a global M2M solution within domestic scenarios. However, this does not prevent the use of the present document in other scenarios.

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 reference document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://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] 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 and audio coding and transmission".
- [9] ETSI EN 300 444: "Digital Enhanced Cordless Telecommunications (DECT); Generic Access Profile (GAP)".
- [10] ETSI TS 102 527-3: "Digital Enhanced Cordless Telecommunications (DECT); New Generation DECT; Part 3: Extended Wideband Speech Services".
- [11] ETSI TS 102 527-1: "Digital Enhanced Cordless Telecommunications (DECT); New Generation DECT; Part 1: Wideband speech".
- [12] ETSI TS 102 939-1 (V1.1.1): "Digital Enhanced Cordless Telecommunications (DECT); Ultra Low Energy (ULE); Machine to Machine Communications; Part 1: Home Automation Network (phase 1)".
- [13] ETSI TS 102 527-4: "Digital Enhanced Cordless Telecommunications (DECT); New Generation DECT; Part 4: Light Data Services; Software Update Over The Air (SUOTA), content downloading and HTTP based applications".
- [14] ETSI TS 102 497: "Digital Enhanced Cordless Telecommunications (DECT); DECT in the 1 920 MHz to 1 930 MHz Unlicensed Personal Communications Services (UPCS) frequency band; Specific requirements".
- [15] ARIB STD-T101: "Radio Equipment Used For TDMA Digital Enhanced Cordless Telecommunications"; (English version).
- [16] ETSI EN 301 649: "Digital Enhanced Cordless Telecommunications (DECT); DECT Packet Radio Service (DPRS)".
- [17] ETSI EN 300 700: "Digital Enhanced Cordless Telecommunications (DECT); Wireless Relay Station (WRS)".

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 reference 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.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] ISO/IEC 9646-6: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 6: Protocol profile test specification".
- [i.2] Recommendation ITU-T G.726 (12/1990): "40, 32, 24, 16 kbit/s Adaptive Differential Pulse Code Modulation (ADPCM)".
- [i.3] Recommendation ITU-T G.711 (11/1988): "Pulse code modulation (PCM) of voice frequencies".
- [i.4] Recommendation ITU-T G.722 (11/1988): "7 kHz audio-coding within 64 kbit/s".
- [i.5] Recommendation ITU-T G.729.1 (05/2006): "G.729 based embedded variable bit-rate coder: An 8-32 kbit/s scalable wideband coder bitstream interoperable with G.729".
- [i.6] ISO/IEC JTC1/SC29/WG11 (MPEG): International Standard ISO/IEC 14496-3:2009: "Information Technology - Coding of audio-visual objects - Part 3: Audio".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in ETSI TS 102 939-1 [12], ETSI TS 102 527-1 [11], ETSI TS 102 527-4 [13] and the following apply:

circuit mode: DECT connections involving setup of the MAC connection using Basic Connection control or Advanced Connection control, but not the "expedited" setup messages

NOTE: Such connections generally last of the order of several seconds (or several minutes for voice calls).

hybrid device: ULE device supporting voice and/or non-ULE data service

Last Minute Scan (LMS): RSSI scan which is generally performed at the last opportunity before transmission (e.g. in the frame before transmission)

Least Interfered Channel (LIC): slot/carrier pair which has the lowest level of interference, usually within a certain level of tolerance or range of values

NOTE: Calculation of the LIC generally requires a full matrix RSSI scan of all available slot/carrier combinations.

packet mode: DECT connections involving setup of the MAC connection using the Advanced Connection control "expedited" messages

NOTE: Such connections generally last of the order of a few frames only.

Personal Handy-phone System (PHS): cordless network telephony system operating in the 1 880 - 1 930 MHz frequency band

NOTE: PHS is used mainly in Japan, China, Taiwan, and some other Asian countries and regions.

3.2 Symbols

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

BA (bits)	B-field identification bits, the bits from the A-field header that provide indication for the content of the B-field of one MAC layer packet
BCK	bit used for I_p channel flow control in MAC I_p error correction services
B_S	Slow Broadcast channel
B_U	ULE Broadcast channel
C	for conditional to support (process mandatory)
C	higher layer control Channel (see C_S and C_F)
C_F	higher layer signalling Channel (Fast)
C-plane	Control plane
C_S	higher layer signalling Channel (Slow)
E+U	Mode of the B-field E/U multiplexer carrying U-plane data and signalling
G_F	higher layer information control channel (fast) (a logical channel to the MAC layer)
G_{FA}	higher layer information control channel (slow) (a logical channel to the MAC layer)
I	for out-of-scope (provision optional, process optional) not subject for testing
I	higher layer Information channel (see I_N and I_P)
I_N	higher layer Information channel (unprotected)
I_P	higher layer Information channel protected (in general, any variant)
I_{PF}	higher layer Information channel (protected) transported multiplexed with signalling in the E+U type slots
I_{PM}	higher layer Information channel, multi-subfield (protected) B-field with error detection only