ETSI TS 102 939-1 V1.3.1 (2017-10)

Digital Enhanced Cordless Telecommunications (DECT);
Ultra Low Energy (ULE);
Machine to Machine Communications;
Part 1: Home Automation Network (phase 1)

Reference
RTS/DECT-ULE272

Keywords
access, data, DECT, environment, IMT-2000,
intelligent homes & buildings, internet,
interoperability, interworking, M2M, mobility,
packet mode, profile, radio, synchronization,
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 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

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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] and ETSI EN 301 649 [i.4]. Further details of the DECT system may be found in ETSI TR 101 178 [i.1].

The present document has been developed in accordance to the rules of documenting a profile specification as described in ISO/IEC 9646-6 [i.2].

The present document is part 1 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)".

The present document defines the functionality for phase 1 of DECT Ultra Low Energy (ULE), Home Automation Network (HAN). Further phases with additional functionality will 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) provides bi-directional radio communication with medium range, data protection, and Ultra Low Power consumption between different types of Portable Devices and Radio Fixed Parts.

DECT 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 [i.4]. However DECT ULE includes substantial differences with its parent technology in order to achieve Ultra Low Power consumption.

The maximum radio coverage range of DECT ULE will be the same as standard DECT technology. Smaller coverage may be defined for specific applications due to power consumption and spectrum use considerations.

DECT ULE has been designed to be coexistent with other DECT applications (including GAP or NG-DECT). Different types of DECT devices may be used over the same spectrum, and mixed devices supporting DECT ULE and other DECT applications may be built. It is foreseen that the majority of DECT ULE RFPs and some DECT ULE PPs will be mixed devices.

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 (AP) 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], and the DECT Packet Radio Service (DPRS) ETSI EN 301 649 [i.4]

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.

The following three types of PP devices are part of DECT ULE phase 1. Additional device types may be added in further ULE phases:

- Fast Actuator type PP
  Devices optimized for fast response times (both ways) and significant FP to PP traffic. Typical applications are, for instance, electricity control elements. Fast actuators are normally line powered.

- Slow Actuator type PP
  Devices optimized for medium response times and significant Fixed Part to Portable Part traffic. Typical applications are, for instance, thermostats and related control elements. Slow actuators are normally battery powered.

- Sensor type PP
  Devices characterized by long sleep times, traffic dominated by Portable Part to Fixed Part direction and optimized for minimal battery consumption. Sensors are typically battery powered and are still able to provide fast response times from Portable Part to Fixed Part. Typical applications are, for instance, command elements in electricity control, smoke detectors and motion detectors.

1 Scope

The present document specifies the first set of functionalities of the ETSI radio technology named DECT Ultra Low Energy (ULE).

The set of features defined in the present document is named "Home Automation Network (HAN), phase 1", 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.

DECT Ultra Low Energy (ULE) Part 1 (the present document) provides the following basic functionalities:

- New MAC layer procedures optimized for ULE:
  - Ultra-fast "expedited" MAC procedures allowing combined transmission of signalling and data packet in the very first frame.
  - Unlocked, ultra low duty cycle operation for battery powered Portable Part devices.
  - New Channel selection processes with channel pre-selection and management algorithms for collision prevention and collision avoidance.
  - U-plane protected service I_{PQR} with automatic retransmission (ARQ) capabilities.
- New DLC service (LU14) incorporating CCM authenticated encryption.
- Network (NWK) Layer Connection Oriented model including CC (Call Control) and MM (Mobility Management) entities.
- State of the art Security.

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/.

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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".