



## System Reference document (SRdoc); DECT operating in the 1 900 MHz - 1 920 MHz band

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# Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM).

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# Modal verbs terminology

In the present document **"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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# Executive summary

The Digital Enhanced Cordless Telecommunications (DECT) system has started its operation in Europe in the band 1 880 MHz - 1 900 MHz. It has spread around the globe and has become the most successful digital cordless telephone system in the world.

DECT is well-known for digital cordless telephony and voice focused solutions (e.g. cordless phones, cordless headsets), in both domestic home market where low-cost single cell devices are used and in the business market, which requires multi-cell systems with more complex functionality. Wide band and super wide band speech codecs have been introduced in DECT and ETSI TC DECT is working on integrating the newest technology advancements available. Clearly, DECT successfully managed to address new markets by improvement and evolution of features and technology.

With the 'Ultra Low Energy' (ULE) Technical Specification DECT ([i.27] and [i.28]) is supporting applications in machine-to-machine communication, Internet of Things (IoT), and Smart Home Automation. Further, the ability of DECT to enable highly effective application specific protocols it attracted audio conferencing and wireless microphones (PMSE).

DECT enables highly-effective application-specific communication protocols as well as IP-based communication including support of the IPv6 standard. DECT is thereby already now well-positioned to serve as technology for several vertical industries (Industry 4.0, PMSE, e-Health, ...).

DECT is part of the IMT-2000 family of standards called IMT-2000 FDMA/TDMA and is so far the only IMT standard available for license-exempt or de-licensed operation in IMT bands.

ETSI TC DECT is currently following two parallel development paths: DECT evolution and DECT-2020 [i.29]:

- DECT evolution is an update of the DECT standard to improve support of applications regarding latency, data-rate, and reliability based on the latest existing chipsets.
- DECT-2020 updates the air interface to OFDM FDMA/TDMA and will especially on support for URLLC and mMTC (including mesh networking) use cases in end-user deployed and operated networks. ETSI DECT-2020 is a candidate for being part of the IMT-2020 family of standards.

DECT has interworking profiles available for interworking with GSM and UMTS networks. ETSI TC DECT will define additional interworking profiles for LTE and 3GPP 5G-NR to provide complementary solution that can operate on license-exempt or licensed shared, local license or licensed IMT bands, with and without cellular operator involvement.

More than one billion DECT devices and several billion chips have been sold worldwide which continues to grow by over by more than 100 million per annum (Source: MZA).

### Why more spectrum is needed?

DECT and the upcoming DECT evolution and DECT-2020 are very efficient, reliable and cost-effective system, as such being very attractive as it provides the right framework to manufacturers to deliver outstanding wireless solutions for a diverse set of applications demanded by the customers.

The reasons that more spectrum for DECT technology is required are basically two-fold.

New services to cater the increasing demand of digitalization of everything requires additional spectrum which is easy to access and available for everyone. This includes the demand of applications targeting Machine Type Communications (MTC) for IoT, Industry 4.0, Home automation enabling e.g. digital twin applications and PMSE use cases as well as the evolution from telephony service to wideband voice and multimedia data transmission.

Secondly, the evolution of the DECT technology from a standard primarily designed for cordless telephony towards a full flavoured local area telecommunications standard addressing wireless applications of various markets (e.g. telephony, IoT, home automation, Industry 4.0, Programme Making and Special Events (PMSE), e-Health, ...). DECT technology is very successful in multiple markets and this continued success might soon lead to local area congestion issues in the DECT core band (1 880 MHz - 1 900 MHz), as the number of DECT terminals will increase massively.

The current limitation of the DECT band will become an increasing inhibitor to the further growth of the technology. The new products and applications will only be successful if adequate spectrum is available.

### Advantages of the band 1 900 MHz - 1 920 MHz

Most technical documents are already available. The carrier numbers and positions for the use of DECT in the 1 900 MHz - 1 920 MHz band are already defined (see ETSI EN 300 175-2 [i.2], annex F) as a consequence of the IMT allocation. The harmonized standard for DECT over this band is already available as part of the IMT-2000 set. It is the ETSI EN 301 908-10 [i.22] (latest release, V4.2.2). An additional harmonized standard for DECT is ETSI EN 301 406 [i.30].

Therefore, an immediate implementation is possible. It should be noted that the frequencies 1 900 MHz - 1 930 MHz are already in use by DECT in non-EU countries and that there are already products (> 100 million of devices) in operation over these frequencies. Nearly all DECT chipset and RF parts vendors are already providing components compatible with the proposed new allocation. There is no other band where the DECT extension is as simple and immediate.

DECT technology gains its strength from license-exempt, but protected operation in 1 880 MHz - 1 900 MHz, which is the DECT core band designated by ERC/DEC(94)03 [i.31] for DECT operation.

The frequency band 1 900 MHz - 1 920 MHz is allocated to the mobile service on a primary basis in the European Common Allocation Table ERC Report 25 [i.32] and in the ITU Radio Regulations. The band is well suited and foreseen for TDD operation.

ETSI TC DECT is preparing IMT-2020 technology submission, which is based on TDD-mode well suited for 1 900 MHz - 1 920 MHz operation.

DECT is part of the IMT-2000 family of standards called IMT-2000 FDMA/TDMA and making use of TDD. Further, DECT technology enables already today within its standard other applications of land mobile services, like PMSE (SAP/SAB).

The band 1 900 MHz - 1 920 MHz would deliver supplementary radio spectrum resources to DECT operation and would provide effective means to overcome the likely future congestion of the DECT core band.

It is obvious that DECT operation on supplementary resources in 1 900 MHz - 1 920 MHz can follow different approaches regarding licensing regimes and access conditions.

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## Introduction

The present document includes necessary information to support the cooperation under the MoU between ETSI and the Electronic Communications Committee (ECC) of the European Conference of Post and Telecommunications Administrations (CEPT).

The present document was developed by ETSI TC DECT and approved by ERM by remote consensus on 17-06-2019. It contains final information.

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# 1 Scope

The present document describes DECT operating in the frequency band 1 900 MHz - 1 920 MHz.

It includes in particular:

- Market information.
- Technical information.
- Regulatory issues.

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## 2 References

### 2.1 Normative references

Normative references are not applicable in the present document.

### 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.

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] ETSI EN 300 175-1: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 1: Overview"
- [i.2] ETSI EN 300 175-2: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 2: Physical Layer (PHL)".
- [i.3] ETSI EN 300 175-3: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 3: Medium Access Control (MAC) layer".
- [i.4] ETSI EN 300 175-4: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 4: Data Link Control (DLC) layer".
- [i.5] ETSI EN 300 175-5: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 5: Network (NWK) layer".
- [i.6] ETSI EN 300 175-6: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 6: Identities and addressing".
- [i.7] ETSI EN 300 175-7: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 7: Security features".
- [i.8] ETSI EN 300 175-8: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 8: Speech and audio coding and transmission".
- [i.9] ETSI EN 300 176 (all parts): "Digital Enhanced Cordless Telecommunications (DECT); Test specification".
- [i.10] Recommendation ITU-R M.1457: "Detailed specifications of the radio interfaces of International Mobile Telecommunications-2000 (IMT-2000)".



- [i.11] ERC Report 31 (June 1994): "Compatibility between DECT and DCS1800".
- [i.12] ERC Report 100 (February 2000): "Compatibility between certain radio communications systems operating in adjacent bands, evaluation of DECT / GSM 1800 compatibility".
- [i.13] ECC Report 96 (March 2007): "Compatibility between UMTS 900/1800 and systems operating in adjacent bands".
- [i.14] ECC Report 146 (June 2010): "Compatibility between GSM MCBTS and other services (TRR, RSBN/PRMG, HC-SDMA, GSM-R, DME, MIDS, DECT) operating in the 900 and 1 800 MHz frequency bands".
- [i.15] CEPT Report 41 (November 2010): "Compatibility between LTE and WiMAX operating within the bands 880-915 MHz / 925-960 MHz and 1 710-1 785 MHz / 1 805-1 880 MHz (900/1 800 MHz bands) and systems operating in adjacent bands".
- [i.16] ERC Report 65 (November 1999): "Adjacent band compatibility between UMTS and other services in the 2 GHz Band".
- [i.17] CEPT Report 39 (June 2010): "Report from CEPT to the European Commission in response to the Mandate to develop least restrictive technical conditions for 2 GHz bands".
- [i.18] ETSI TR 103 089: "Digital Enhanced Cordless Telecommunications (DECT); DECT properties and radio parameters relevant for studies on compatibility with cellular technologies operating on frequency blocks adjacent to the DECT frequency band".
- [i.19] Recommendation ITU-R M.1036-5: "Frequency arrangements for implementation of the terrestrial component of International Mobile Telecommunications-2000 (IMT 2000) in the bands 806 960 MHz, 1 710-2 025 MHz, 2 110 2 200 MHz and 2 500-2 690 MHz".
- [i.20] ITU Radio Regulations.
- [i.21] Void.
- [i.22] ETSI EN 301 908-10: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 10: Harmonised Standard for IMT-2000, FDMA/TDMA (DECT) covering the essential requirements of article 3.2 of the Directive 2014/53/EU".
- [i.23] ETSI TR 101 310: "Digital Enhanced Cordless Telecommunications (DECT); Traffic capacity and spectrum requirements for multi-system and multi-service DECT applications co-existing in a common frequency band".
- [i.24] ETSI EN 300 444: "Digital Enhanced Cordless Telecommunications (DECT); Generic Access Profile (GAP)".
- [i.25] ETSI EN 301 649: "Digital Enhanced Cordless Telecommunications (DECT); DECT Packet Radio Service (DPRS)".
- [i.26] ETSI TS 102 527-1: "Digital Enhanced Cordless Telecommunications (DECT); New Generation DECT; Part 1: Wideband speech".
- [i.27] ETSI TS 102 939-1: "Digital Enhanced Cordless Telecommunications (DECT); Ultra Low Energy (ULE); Machine to Machine Communications; Part 1: Home Automation Network (phase 1)".
- [i.28] ETSI TS 102 939-2: "Digital Enhanced Cordless Telecommunications (DECT); Ultra Low Energy (ULE); Machine to Machine Communications; Part 2: Home Automation Network (phase 2)".
- [i.29] ETSI TR 103 514: "Digital Enhanced Cordless Telecommunications (DECT); DECT-2020 New Radio (NR) interface; Study on Physical (PHY) layer".
- [i.30] ETSI EN 301 406: "Digital Enhanced Cordless Telecommunications (DECT); Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU".

- [i.31] ERC/DEC(94)03: "ERC Decision of 24th October 1994 on the frequency band to be designated for the coordinated introduction of the Digital European Cordless Telecommunications system (ERC/DEC/(94)03)".
- [i.32] ERC Report 25 (March 2019): "The European Table of Frequency; Allocations and Applications in the Frequency Range 8.3 kHz to 3000 GHz (ECA Table)".
- [i.33] ECC Report 294 (February 2019): "Assessment of the spectrum needs for future railway mobile radio (RMR) communications".

## 3 Definition of terms, symbols and abbreviations

### 3.1 Terms

Void.

### 3.2 Symbols

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

$F_c$	Carrier Frequency
$F_L$	Lower Frequency
$F_U$	Upper Frequency

### 3.3 Abbreviations

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

3GPP	Third Generation Partnership Project
AM	Amplitude Modulation
BER	Bit Error Rate
CEPT	Commission Européenne des Postes et Télécommunications
DECT	Digital Enhanced Cordless Telecommunications
DPRS	DECT Packet Radio Service
DSL	Digital Subscriber Line
ECC	Electronic Communications Committee
EIRP	Effective Isotropic Radiated Power
ERC	European Radiocommunications Committee
FDMA	Frequency Division Multiple Access
FRMCS	Future Railway Mobile Communication System
GAP	Generic Access Profile
GoS	Grade of Service
GSM	Global System for Mobile Communications
GSM-R	Global System for Mobile Communications – Rail(way)
ICT	Information Communication Technology
iDCS	instant Dynamic Channel Selection
IMT	International Mobile Telecommunications
IoT	Internet of Things
IP	Internet Protocol
IPR	Intellectual Property Rights
ITU	International Telecommunications Union
ITU-R	International Telecommunication Union - Radiocommunication sector
M2M	Machine to Machine
MAC	Medium Access Control
mMTC	massive MTC
MTC	Machine Type Communication
NR	New Radio
NTP	Normal Transmitted Power