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STN	**Digitálne bezšnúrové telekomunikácie (DECT) Špecifikácia skúšok Časť 2: Zvuk a hovor**	**STN EN 300 176-2 V2.4.1** 87 0176

Digital Enhanced Cordless Telecommunications (DECT); Test specification; Part 2: Audio and speech

Táto norma obsahuje anglickú verziu európskej normy.
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Contents

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Foreword

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

The present document contains text pertaining to approval testing of the Digital Enhanced Cordless Telecommunications (DECT) Common Interface. Such text should be considered as guidance to approval (or licensing) authorities.

Details of the DECT Common Interface may be found in ETSI EN 300 175-1 [1] to ETSI EN 300 175-8 [8]. Further details of the DECT system may be found in the ETSI Technical Reports, ETSI TR 101 178 [i.1] and ETSI ETR 043 [i.7].

The present document is part 2 of a multi-part deliverable covering the approval test specification for Digital Enhanced Cordless Telecommunications (DECT), as identified below:

Part 1: "Radio";

Part 2: "Audio and speech".

National transposition dates	
Date of adoption of this EN:	12 May 2022
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Date of latest publication of new National Standard or endorsement of this EN (dop/e):	28 February 2023
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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 specifies the tests applicable to all Digital Enhanced Cordless Telecommunications (DECT) equipment accessing any DECT frequency band (including applicable IMT-2000 frequency bands) and the tests applicable to DECT speech and audio transmission using any of the codecs and any of the audio specifications described in ETSI EN 300 175-8 [8].

The aims of the present document are to ensure:

- efficient use of frequency spectrum;
- no harm done to any connected network and its services;
- no harm done to other radio networks and services;
- no harm done to other DECT equipment or its services;
- interworking of terminal equipment via any public telecommunications network, including the ISDN/PSTN network and the Internet,

through testing those provisions of ETSI EN 300 175-1 [1] to ETSI EN 300 175-8 [8] which are relevant to these aims.

The tests of ETSI EN 300 176 are split into two parts:

- part 1 [9] covers testing of radio frequency parameters, security elements and those DECT protocols that facilitate the radio frequency tests and efficient use of frequency spectrum;
- part 2 (the present document) describes testing of speech and audio requirements between network interface and DECT PT, or between a DECT CI air interface and alternatively a DECT PT or FT.
  The present document is not applicable to terminal equipment specially designed for the disabled (e.g. with amplification of received speech as an aid for the hard of hearing).

DECT terminal equipment consists of the following elements:

a) Fixed Part (FP);

b) Portable Part (PP);

c) Cordless Terminal Adapter (CTA);

d) Wireless Relay Stations (WRS) (FP and PP combined).

The present document is structured to allow tests of either:

a) the FP and PP together; or

b) the FP and PP as separate items.

Where the DECT FP is connected to a PSTN, and there are any peculiarities in the requirements for voice telephony, these will be accommodated within the FP.

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] 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 300 176-1: "Digital Enhanced Cordless Telecommunications (DECT); Test specification; Part 1: Radio".

[10] Void.

[11] Void.

[12] ETSI ETS 300 540: "Digital cellular telecommunications system (Phase 2) (GSM); Transmission planning aspects of the speech service in the GSM Public Land Mobile Network (PLMN) system (GSM 03.50)".

[13] Void.

[14] Void.

[15] Recommendation ITU-T G.111 (1993): "Loudness ratings (LRs) in an international connection".

[16] Recommendation ITU-T G.122 (1993): "Influence of national systems on stability and talker echo in international connections".

[17] Recommendation ITU-T G.223 (1988): "Assumptions for the calculation of noise on hypothetical reference circuits for telephony".

[18] Void.

[19] Recommendation ITU-T G.711: "Pulse code modulation (PCM) of voice frequencies".

[20] Recommendation ITU-T G.712: "Transmission performance characteristics of pulse code modulation channels".

[21] Recommendation ITU-T G.722: "7 kHz audio-coding within 64 kbit/s".

[22] Recommendation ITU-T G.722 (Appendix III): "A high quality packet loss concealment algorithm for G.722".

[23] Recommendation ITU-T G.722 (Appendix IV): "A low-complexity algorithm for packet loss concealment with G.722".

[24] Recommendation ITU-T G.726: "40, 32, 24, 16 kbit/s Adaptive Differential Pulse Code Modulation (ADPCM)".

[25] Recommendation ITU-T G.729.1: "G.729 based embedded variable bit-rate coder: An 8-32 kbit/s scalable wideband coder bitstream interoperable with G.729".

[26] Recommendation ITU-T G.1020: "Performance parameter definitions for quality of speech and other voiceband applications utilizing IP networks".

[27] Recommendation ITU-T O.41: "Psophometer for use on telephone-type circuits".

[28] Recommendation ITU-T O.132 (1988): "Quantizing distortion measuring equipment using a sinusoidal test signal".

[29] Recommendation ITU-T O.133 (1993): "Equipment for measuring the performance of PCM encoders and decoders".

[30] Void.

[31] Recommendation ITU-T P.50 (1999): "Artificial voices".

[32] Recommendation ITU-T P.51 (1996): "Artificial mouth".

[33] Recommendation ITU-T P.56: "Objective measurement of active speech level".

[34] Recommendation ITU-T P.57: "Artificial ears".

[35] Recommendation ITU-T P.58: "Head and torso simulator for telephonometry".

[36] Recommendation ITU-T P.64: "Determination of sensitivity/frequency characteristics of local telephone systems".

[37] Recommendation ITU-T P.79: "Calculation of loudness ratings for telephone sets".

[38] Recommendation ITU-T P.311: "Transmission characteristics for wideband digital handset and headset telephones".

[39] Recommendation ITU-T P.340: "Transmission characteristics and speech quality parameters of hands-free terminals".

[40] Recommendation ITU-T P.380: "Electro-acoustic measurements on headsets".

[41] Recommendation ITU-T P.501: "Test signals for use in telephony and other speech-based applications".

[42] Recommendation ITU-T P.502: "Objective test methods for speech communication systems using complex test signals".

[43] Recommendation ITU-T P.581: "Use of head and torso simulator for hands-free and handset terminal testing".

[44] ISO 3 (1973): "Preferred numbers -- Series of preferred numbers".

[45] IEC 61260-1: "Electroacoustics -- Octave-band and fractional-octave-band filters Part 1: Specifications".

[46] ISO 9614 (all parts): "Acoustics -- Determination of sound power levels of noise sources using sound intensity".

[47] Void.

[48] ISO/IEC 14496-3:2009: "Information Technology -- Coding of audio-visual objects -- Part 3: Audio".

[49] ETSI TBR 038: "Public Switched Telephone Network (PSTN); Attachment requirements for a terminal equipment incorporating an analogue handset function capable of supporting the justified case service when connected to the analogue interface of the PSTN in Europe".

[50] ETSI EN 300 700: "Digital Enhanced Cordless Telecommunications (DECT); Wireless Relay Station (WRS)".

[51] ETSI I-ETS 300 245-3: "Integrated Services Digital Network (ISDN); Technical characteristics of telephony terminals; Part 3: Pulse Code Modulation (PCM) A-law, loudspeaking and handsfree telephony".

[52] Directive 2006/95/EC of the European Parliament and of the Council of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits (codified version).

[53] Recommendation ITU-T G.191: "Software tools for speech and audio coding standardization".

[54] Recommendation ITU-T G.726 (Appendix II): "Digital test sequences for the verification of the G.726 40, 32, 24 and 16 kbit/s ADPCM algorithm".

[55] Recommendation ITU-T G.722 (Appendix II): "Digital test sequences for the verification of the G.722 64 kbit/s SB-ADPCM 7 kHz codec".

[56] Recommendation ITU-T G.729.1 (Amendment 1): "New Annex A on G.729.1 usage in H.245, plus corrections to the main body and updated test vectors".

[57] Recommendation ITU-T P.360: "Efficiency of devices for preventing the occurrence of excessive acoustic pressure by telephone receivers and assessment of daily noise exposure of telephone users".

[58] ETSI TS 103 634: "Digital Enhanced Cordless Telecommunications (DECT); Low Complexity Communication Codec plus (LC3plus)".

[59] ETSI TS 103 224: "Speech and multimedia Transmission Quality (STQ); A sound field reproduction method for terminal testing including a background noise database".

[60] ETSI TS 102 924: "Speech and multimedia Transmission Quality (STQ); Transmission requirements for Super-Wideband / Fullband handset and headset terminals from a QoS perspective as perceived by the user".

[61] ETSI TS 102 925: "Speech and multimedia Transmission Quality (STQ); Transmission requirements for Super-Wideband / Fullband handsfree and conferencing terminals from a QoS perspective as perceived by the user".

[62] Void.

[63] Void.

[64] ETSI TS 103 281: "Speech and multimedia Transmission Quality (STQ); Speech quality in the presence of background noise: Objective test methods for super-wideband and fullband terminals".

[65] Void.

[66] Recommendation ITU-T P.10: "Vocabulary for performance, quality of service and quality of experience".

[67] ISO 3745: "Acoustics -- Determination of sound power levels and sound energy levels of noise sources using sound pressure -- Precision methods for anechoic rooms and hemi-anechoic rooms".

[68] Void.

[69] ETSI TS 126 071: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Mandatory speech CODEC speech processing functions; AMR speech Codec; General description (3GPP TS 26.071)".

[70] ETSI TS 126 171: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Speech codec speech processing functions; Adaptive Multi-Rate - Wideband (AMR-WB) speech codec; General description (3GPP TS 26.171)".

[71] ETSI TS 126 441: "Universal Mobile Telecommunications System (UMTS); LTE; Codec for Enhanced Voice Services (EVS); General overview (3GPP TS 26.441)".

[72] IETF RFC 6716: "Definition of the Opus Audio Codec".

[73] Recommendation ITU-T G.701: "Vocabulary of digital transmission and multiplexing, and pulse code modulation (PCM) terms".

[74] Recommendation ITU-T P.700: "Calculation of loudness for speech communication".

[75] Recommendation ITU-T P.341: "Transmission characteristics for wideband digital loudspeaking and hands-free telephony terminals".

[76] Recommendation ITU-T P.342: "Transmission characteristics for narrow-band digital loudspeaking and hands-free telephony terminals".

[77] ETSI TS 103 706: "Digital Enhanced Cordless Telecommunications (DECT); Advanced Audio Profile".

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 TR 101 178: "Digital Enhanced Cordless Telecommunications (DECT); A High Level Guide to the DECT Standardization".

[i.2] IETF RFC 791 (STD 5): "Internet Protocol".

[i.3] IETF RFC 768 (STD 6): "User Datagram Protocol".

[i.4] IETF RFC 3550: "RTP: Transport Protocol for Real-time Applications".

[i.5] ETSI TBR 008 (1998): "Integrated Services Digital Network (ISDN); Telephony 3,1 kHz teleservice; Attachment requirements for handset terminals".

[i.6] Void.

[i.7] ETSI ETR 043: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Services and facilities requirements specification".

[i.8] ETSI ES 202 737: "Speech and multimedia Transmission Quality (STQ); Transmission requirements for narrowband VoIP terminals (handset and headset) from a QoS perspective as perceived by the user".

[i.9] ETSI ES 202 738: "Speech and multimedia Transmission Quality (STQ); Transmission requirements for narrowband VoIP loudspeaking and handsfree terminals from a QoS perspective as perceived by the user".

[i.10] ETSI ES 202 739: "Speech and multimedia Transmission Quality (STQ); Transmission requirements for wideband VoIP terminals (handset and headset) from a QoS perspective as perceived by the user".

[i.11] ETSI ES 202 740: "Speech and multimedia Transmission Quality (STQ); Transmission requirements for wideband VoIP loudspeaking and handsfree terminals from a QoS perspective as perceived by the user".

[i.12] ETSI I-ETS 300 245-6: "Integrated Services Digital Network (ISDN); Technical characteristics of telephony terminals; Part 6: Wideband (7 kHz), loudspeaking and hands free telephony".

[i.13] Recommendation ITU-T G.113 (2001): "Transmission impairments due to speech processing".

[i.14] Recommendation ITU-T G.107 (2005): "The E-Model, a computational model for use in transmission planning".

[i.15] Recommendation ITU-T G.108 (1999): "Application of the E-model: A planning guide".

[i.16] Recommendation ITU-T G.109 (1999): "Definition of categories of speech transmission quality".

[i.17] Void.

[i.18] Recommendation ITU-T G.101 (2003): "The transmission plan".

[i.19] Recommendation ITU-T G.131 (2003): "Talker echo and its control".

[i.20] Recommendation ITU-T G.164 (1988): "Echo suppressors".

[i.21] Recommendation ITU-T G.165 (1993): "Echo cancellers".

[i.22] Recommendation ITU-T G.168 (2004): "Digital network echo cancellers".

[i.23] ISO/IEC 14496-4:2004: "Information technology -- Coding of audio-visual objects -- Part 4: Conformance testing".

[i.24] Recommendation ITU-R BS.1387-1: "Method for objective measurements of perceived audio quality".

[i.25] Void.

[i.26] Void.

[i.27] IEEE 802.11™: "Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications".

[i.28] IEEE 802.3™: "IEEE Standard for Information Technology - Telecommunications and Information Exchange between systems - Local and metropolitan area networks - Specific requirements Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications".

[i.29] European Broadcasting Union (EBU) - Tech 3253: "Sound Quality Assessment Material (SQAM)".

NOTE: Available at https://tech.ebu.ch/publications/sqamcd.

[i.30] ISO 1999: "Acoustics -- Determination of occupational noise exposure and estimation of noise-induced hearing impairment".

[i.31] Recommendation ITU-T Y.1541: "Network performance objectives for IP-based services".

[i.32] ETSI EG 202 518: "Speech and multimedia Transmission Quality (STQ); Acoustic Output of Terminal Equipment; Maximum Levels and Test Methodology for Various Applications".

[i.33] Void.

[i.34] ETSI EG 202 396-3: "Speech and multimedia Transmission Quality (STQ); Speech quality performance in the presence of background noise; Part 3: Background noise transmission - Objective test methods".

[i.35] Recommendation ITU-T P.310: "Transmission characteristics for narrow-band digital handset and headset telephones".

[i.36] TIA-920.130-A: "Telecommunications Telephone Terminal Equipment Transmission Requirements for Wideband Digital Wireline Telephones with Headset".

[i.37] Void.