



SLOVENSKI STANDARD

SIST ETS 300 401:1999

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Sistemi radiodifuzije - Digitalna zvokovna radiodifuzija (DAB) za mobilne, prenosne in fiksne sprejemnike

Radio broadcasting systems; Digital Audio Broadcasting (DAB) to mobile, portable and fixed receivers

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mobile, portable and fixed receivers**

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Foreword

This second edition European Telecommunication Standard (ETS) has been produced by the Joint Technical Committee (JTC) of the European Broadcasting Union (EBU), Comité Européen de Normalisation ELECTrotechnique (CENELEC) and the European Telecommunications Standards Institute (ETSI).

NOTE 1: The EBU/ETSI JTC was established in 1990 to co-ordinate the drafting of ETSs in the specific field of broadcasting and related fields. Since 1995 the JTC became a tripartite body by including in the Memorandum of Understanding also CENELEC, which is responsible for the standardization of radio and television receivers. The EBU is a professional association of broadcasting organizations whose work includes the co-ordination of its Members' activities in the technical, legal, programme-making and programme-exchange domains. The EBU has Active Members in about 60 countries in the European Broadcasting Area; its headquarters is in Geneva*.

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This ETS on Digital Audio Broadcasting (DAB) is based on the overall system and service requirements adopted by the ITU-R Recommendations 774 [1] and 789 [2]. The DAB system has been recommended by the ITU-R, as Digital System A, for terrestrial and satellite delivery [16], [17]. The audio coding algorithm used by the DAB system has been subject to the standardization process within the ISO/Moving Pictures Expert Group (MPEG), see ISO/IEC 11172-3 [3] and ISO/IEC 13818-3 [14]. The layered ISO open system interconnect model ISO 7498 [4] has been used to the extent possible, and interfacing to information technology equipment and communications networks has been taken into account where applicable.

<http://www.etsi.org>

NOTE 2: DAB is a registered trademark owned by one of the Eureka 147 partners.

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This ETS defines the nature and content of the transmitted DAB signal with reference to the conceptual emission part. The emphasis is given to the normative elements. Informative elements are included only to the extent necessary to provide interpretative guidance to the DAB system users and equipment manufacturers.

The DAB system is a novel sound broadcasting system intended to supersede the existing analogue amplitude and frequency modulation systems. It is a rugged, yet highly spectrum and power efficient sound and data broadcasting system. It has been designed for terrestrial and satellite as well as for hybrid and mixed delivery. The DAB system has been publicly demonstrated on a number of occasions during its development. It has been subject to extensive field tests and computer simulations in Europe and elsewhere. In 1995, the European DAB Forum (EuroDab) was established to pursue the introduction of DAB services in a concerted manner world-wide, and it became the World DAB forum (World DAB) in 1997.

With respect to the first version of ETS 300 401 published in February 1995, this version contains several refinements to the Eureka 147 DAB system. These refinements were performed and agreed by the Eureka 147 Consortium and include the following areas:

- additional transmission mode (i.e. transmission mode IV) for optimum transmission of DAB signals in Single Frequency Networks (SFNs) in L-band;
- audio half-sampling rate and extension to very low audio bit rates (i.e. 8, 16 and 24 kbit/s);
- refinements of some service features, in particular Conditional Access, Service Identification, Data Service Component Type, Service linking, Time and Country Identifier, Programme Type (language extension) and Announcements (regional extension and "new" flag).

Transposition dates	
Date of adoption:	18 April 1997
Date of latest announcement of this ETS (doa):	31 August 1997
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	28 February 1998
Date of withdrawal of any conflicting National Standard (dow):	28 February 1998

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1 Scope

This European Telecommunication Standard (ETS) establishes a broadcasting standard for the Digital Audio Broadcasting (DAB) system designed for delivery of high-quality digital audio programme and data services for mobile, portable and fixed reception from terrestrial or satellite transmitters in the Very High Frequency (VHF)/Ultra High Frequency (UHF) frequency bands as well as for distribution through cable networks. The DAB system is designed to provide spectrum and power efficient techniques in terrestrial transmitter network planning, known as the Single Frequency Network (SFN) and the gap-filling technique. The DAB system is suitable for satellite as well as hybrid/mixed terrestrial/satellite broadcasting, using a simple, nearly omni-directional receiving antenna. The DAB system meets the required sharing criteria with other radiocommunication services.

This ETS defines the DAB transmission signal. It includes the coding algorithms for audio, multiplexing of audio programme and data services, channel coding and modulation. A limited range of supplementary services associated with programme services is defined. Provision is also made for transmission of additional data services which may be programme related or not, within the limit of the total system capacity. The ETS provides information on the system configuration which includes information about the ensembles, services, service components and linking of them. Provision is made for a compatible cross-reference to existing Frequency Modulation (FM) services.

This ETS describes the nominal characteristics of the emitted DAB signal. The aspects related to the receiver design are outside the scope of this ETS. Hardware implementation considerations are not covered.

2 Normative references

This ETS incorporates, by dated and undated references, provisions from other publications. These normative references are cited at the appropriated places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

- [1] ITU-R Recommendation BS.774 (March 1994): "Digital sound broadcasting to vehicular, portable and fixed receivers using terrestrial transmitters in the VHF/UHF bands".
<https://standards.iteh.ai/catalog/standards/sist/4153b53d-ed1d-47db-87a3-11e8bc11762/sist-ets-300-401-1999>
- [2] ITU-R Recommendation BO.789 (March 1994): "Digital sound broadcasting to vehicular, portable and fixed receivers for BSS (sound) in the frequency range 500 - 3 000 MHz".
- [3] ISO/IEC 11172-3 (March 1993): "Coding of Moving Pictures and Associated Audio for Digital Storage Media at up to 1,5 Mbit/s - Audio Part".
- [4] ISO 7498 (1984): "Open Systems Interconnection (OSI) Basic Reference Model".
- [5] prEN 50067 (1996): "Specification of the Radio Data System (RDS) for VHF/FM broadcasting".
- [6] ITU-T Recommendation X.25 (1993): "Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit".
- [7] ETS 300 250: "Television systems; ETSI/EBU Joint Technical Committee (JTC) Specification of the D2-MAC/packet".
- [8] ETS 300 174 (1992): "Network Aspects (NA); Digital coding of component television signals for contribution quality applications in the range 34-45 Mbit/s".
- [9] ISO 3901 (1986): "International Standard Recording Code (ISRC)".

- [10] Norwegian Telecom, Issue 2 (July 20, 1989): "NR - MSK Access Control System".
- [11] EN 50094 (1992): "Access control system for the MAC/packet family: Eurocrypt".
- [12] IEC 958 (1989), Amendment 1 (1993)(AES/EBU): "Digital Audio Interface".
- [13] CCIR Recommendation 562-3 ITU Radiocommunications Sector, Volume X, (1990): "Subjective assessment of sound quality".
- [14] ISO/IEC 13818-3 (November 1994): "Generic coding of moving pictures and associated audio - Audio part".
- [15] prEN 797: "Bar coding - Symbology specifications Universal Product Code / European Article Number (UPC/EAN)".
- [16] ITU Recommendation BS.1114 (September 1995): "Systems for terrestrial digital sound broadcasting to vehicular, portable and fixed receivers in the frequency range 30 - 3 000 MHz".
- [17] ITU Recommendation BO.1130 (September 1995): "Systems for digital sound broadcasting to vehicular, portable and fixed receivers for BSS(sound) bands in the frequency range 1 400 - 2 700 MHz".
- [18] ISO 8859-2 (1987) "Information processing - 8-bit single-byte coded graphic character sets; Part 2: Latin alphabet No 2".
- [19] CEPT Final Acts Wiesbaden (July 1995): "Special Arrangement of the European Conference of Postal and Telecommunications Administrations (CEPT) relating to the use of the bands 47 - 68 MHz, 87.5 - 108 MHz, 174 - 230 MHz, 230 - 240 MHz and 1452 - 1492 MHz for the introduction of Terrestrial Digital Audio Broadcasting (T-DAB)". [SIST ETS 300 401:1999](https://standards.iteh.ai/catalog/standards/sist/4f53b5fd-ed1d-47db-87a3-31ca8bc1b792/sist-ets-300-401-1999)
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3 Definitions, abbreviations, symbols and conventions

3.1 Definitions

For the purposes of this ETS, the following definitions apply:

Access Control System (ACS): A particular set of rules for managing entitlement checking and conditional access messages.

alias component: Mirrored signal component resulting from sub-Nyquist sampling.

announcement cluster: A group of services which share the same announcement interruption privileges.

audio bit stream: A sequence of consecutive audio frames.

audio frame: A frame of a duration of 24 ms (at 48 kHz sampling frequency) or of 48 ms (at 24 kHz sampling frequency) which contains a Layer II encoded audio signal ISO/IEC 11172-3 [3], ISO/IEC 13818-3 [14], corresponding to 1 152 consecutive audio samples. It is the smallest part of the audio bit stream which is decodable on its own.

audio mode: The audio coding system provides single channel, dual channel, stereo and joint stereo audio modes. In each mode, the complete audio signal is encoded as one audio bit stream.

Auxiliary Information Channel (AIC): All or part of sub-channel 63, used to carry information redirected from the Fast Information Channel.

bark: See "Critical band".

bit allocation: A time-varying assignment of bits to samples in different sub-bands according to a psychoacoustic model.

blackout state: The denial of access to a service because it is restricted for some reason (for example, targeted only to a particular geographical region).

bound: The lowest sub-band in which Intensity stereo coding is used, in the case of Joint stereo mode.

Capacity Unit (CU): The smallest addressable unit (64 bits) of the Common Interleaved Frame (CIF).

Common Interleaved Frame (CIF): The serial digital output from the main service multiplexer which is contained in the Main Service Channel part of the transmission frame. It is common to all transmission modes and contains 55 296 bits (i.e. 864 CUs).

Conditional Access (CA): A mechanism by which the user access to service components can be restricted.

Control Word (CW): A secret part of the IW that depends on the ACS used.

convolutional coding: The coding procedure which generates redundancy in the transmitted data stream in order to provide ruggedness against transmission distortions.

critical band: A psychoacoustic measure in the frequency domain which corresponds to the frequency selectivity of the human ear. The unit of this psychoacoustic measure is called Bark. The Bark scale is a non-linear mapping of the frequency scale over the entire audio frequency range.

DAB audio frame: The same as audio frame, but includes all specific DAB audio-related information.

DAB transmission signal: The transmitted radio frequency signal.

data service: A service which comprises a non-audio primary service component and optionally additional secondary service components.