



SLOVENSKI STANDARD

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01-april-1999

Characteristics of DAB receivers

Characteristics of DAB receivers

Eigenschaften von DAB-Empfängern

Caractéristiques du récepteur DAB

Ta slovenski standard je istoveten z: **EN 50248:1997**

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English version

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 206, Broadcast receiving equipment.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50248 on 1997-10-01.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1998-09-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1998-09-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annex B is normative and annex A is informative.

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1 Scope

This standard describes the DAB (Digital Audio Broadcasting) receiver characteristics for consumer equipment intended for terrestrial and cable reception operating in band III and L- band and for satellite reception in L-band. Dedicated receivers for specific applications are not within the scope of this standard.

2 Definitions, abbreviations, symbols and block diagram

Receivers which are intended to receive and decode programmes transmitted according to the DAB system specification ETSI ETS 300 401 are called DAB receivers.

In this document "A typical value" is an average value that can be used as a basis for planning, whereas "Minimum requirement" is the lowest value that a DAB receiver should fulfil in order to be called a DAB receiver. Minimum requirements take into account low cost receivers.

Other definitions, abbreviations and symbols are solely related to DAB unless stated otherwise. Example of a Functional Block Diagram of a DAB Receiver (see Figure 1. for information only)

3 References

The following documents include provisions which, through reference in this text, constitute provisions of this standard.

If the reference standard is subject to revision, the latest version will apply.

3.1 Normative references. (standards.iteh.ai)

ETSI ETS 300 401	Digital Audio Broadcasting to mobile, portable and fixed receivers. (DAB system standard). https://standards.iteh.ai/catalog/standards/sist/bc952ad2-e909-428d-b14e-093a9ea0bf12/sist-en-50248-1999
ISO/IEC 11172-3	Coding of moving pictures and associated audio for digital storage media at up to 1.5 Mbit/s - Part 3: Audio
ISO/IEC 11172-4	Coding of moving pictures and associated audio for digital storage media at up to 1.5 Mbit/s - Part 4: Compliance testing
ISO/IEC 13818-3	Generic coding of moving pictures and associated audio information - Part 3: Audio
ISO/IEC 13818-4	Generic coding of moving pictures and associated audio information - Part 4: Compliance testing
IEC 268-15	Preferred matching values for the inter-connection of sound system components.
IEC 958	Digital Audio Interface
IEC 1606	Basic methods of measurement of the audio characteristic of the digital audio part of audio and audio-visual equipment.
IEC 315-1	Methods of measurement on radio receivers for various classes of emission. Part 1: General considerations and methods of measurement, including audio-frequency measurement.

IEC 581-11	High fidelity systems for use in vehicles
EN 50255	Digital Audio Broadcasting system - Specification of the Receiver Data Interface (RDI)

3.2 Informative references

EN 50067	Specification of Radio Data Systems (RDS)
prEN 12313	Traffic and Traveller Information (TTI) - TTI Messages via Traffic Message Coding - Coding Protocol for Radio Data System-Traffic Message Channel (RDS-TMC)
IEC 68-1	Environmental testing, Part 1: General and guidance
IEC 721-1	Environmental parameters and their severity's
IEC Guide 106	Guide for specifying environmental conditions for equipment performance rating
CCITT Rec.O.151	Error performance measuring equipment operating at a primary bitrate and above.

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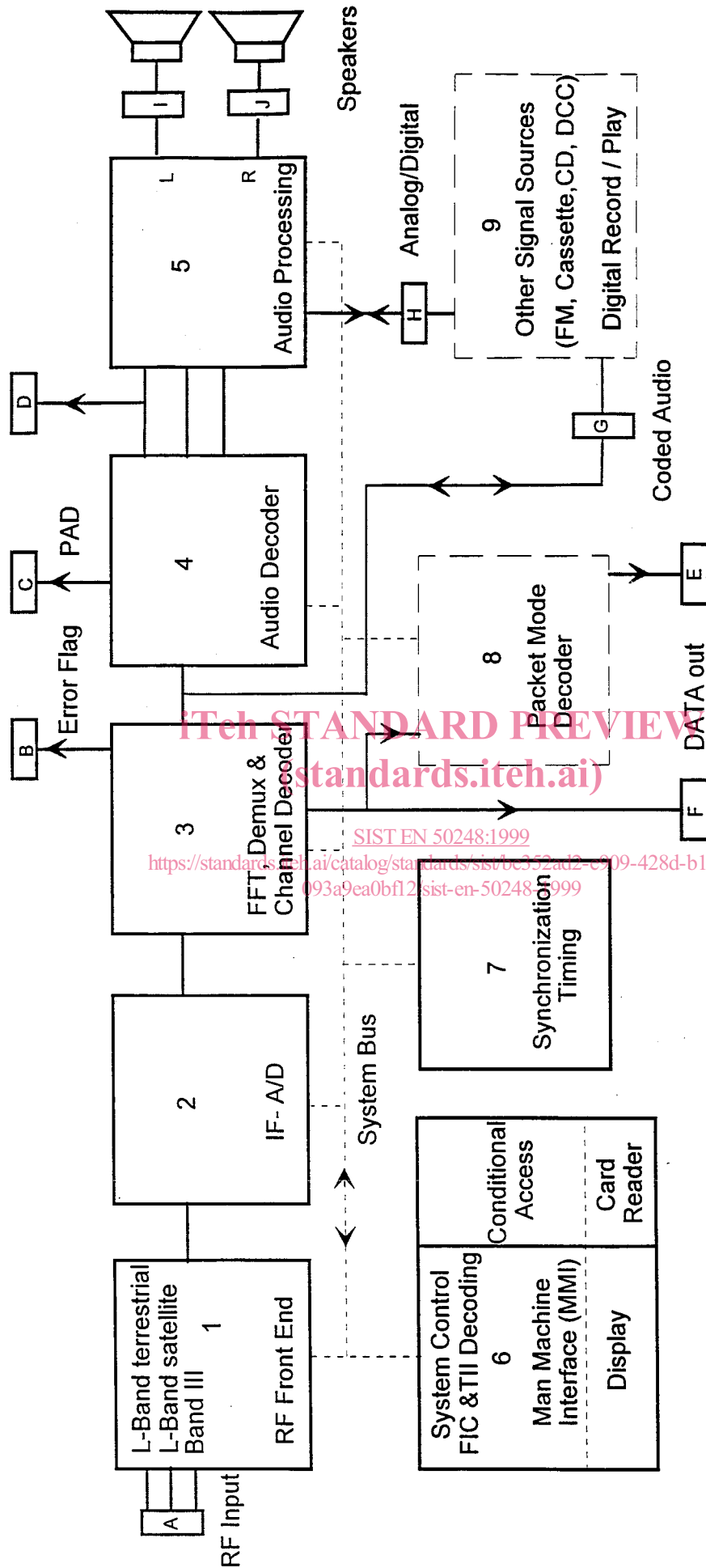


Figure 1
Example of a Functional Block Diagram of a DAB Receiver
 (Block 8 is optional, block 9 is not part of the DAB receiver)

4 Basic implementation and functional performance requirements

4.1 Audio decoder

The audio decoder function of a DAB receiver shall conform to the subset of ISO/IEC 11172-3 as defined in ETSI ETS 300 401. The conformity is described in ISO/IEC 11172-4. The audio decoder should include an error concealment method which may be based on the ScF-CRC (Scale Factor-Cyclic Redundancy Check) as defined within ETSI ETS 300 401. If for any reason the data stream cannot be decoded, the receiver shall mute.

The audio part shall be able to decode DAB bit streams corresponding to both 24 and 48 kHz sampling frequencies.

It shall comply with ISO/IEC 11172-3 and ISO/IEC 13818-3 (bit-rates above 256 kHz/sec are optional).

4.2 Automatic mode selection

4.2.1 Introduction

Four different transmission modes are defined: modes I, II, III & IV. Radio frequency characteristics are described in ETSI ETS 300 401 (see Radio Frequency Characteristics).

The modes can be detected by checking the following relevant parameters of the DAB signal: the frame duration, null symbol duration and carrier spacing.

4.2.2 Requirements

The receiver shall detect the mode of the DAB signal and switch to the appropriate reception mode.

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4.3 Frequency bands

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The receiver shall provide reception of at least one DAB ensemble, in the following RF Bands:

Band III: 174 MHz to 240 MHz

L-Band: 1452 MHz to 1492 MHz (see note)

The centre frequencies are given in Annex A. The receiver should be able to correct transmitter frequency offsets by up to $\pm 1/2$ of the carrier-spacing.

Note: L-Band as defined by ITU WARC-92. L-Band is allocated for both terrestrial and satellite digital sound broadcasting.

see also "Radio Regulations, Article 8 (Frequency Allocations) International Telecommunication Union. Update in 1995 Geneva Switzerland".

4.4 Programme service selection

4.4.1 Introduction

The MSC (Main Service Channel) and the FIC (Fast Information Channel) carry the component and Multiplex Configuration Information (MCI) respectively of the services which make up a DAB Ensemble Multiplex.

Each service has one or more Service Components. As an example, a service could contain a stereo audio component, Service labels in the SI (Service Information) and a Traffic Message Channel prEN 12313. Several services may be carried in one Ensemble Multiplex.

A user of a DAB receiver accesses Service Components by selecting a Service.

A distinction is made between the essential Service component of a Service, which is called the "Primary" component (for a programme service this would normally be the main, or perhaps the only audio stream) and other components which are considered "Secondary".

The MCI is carried in the FIC to avoid the inherent transmission delay associated with the time-interleaving process applied to the MSC.

4.4.2 Requirements

To gain access to the desired Programme Service, the receiver must decode the MCI, make the information available to the MMI (Man Machine Interface) for selection, and then output the selected service.

4.5 Receiver reactions to a multiplex re-configuration

Information on a multiplex reconfiguration is provided in advance, to the receiver. This information includes the following parts:

- the event of a forthcoming multiplex reconfiguration.
- the time when the receiver has to switch according to the MCI (Multiplex Configuration Information).
- next MCI.

The receiver shall follow the multiplex reconfiguration.

In cases where the position and size of the service is unchanged by the reconfiguration, reception of that service should continue without any adverse effect.

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4.6 Automatic switching to another ensemble

In order to allow seamless reception of a particular service component the ability of a DAB receiver to switch automatically to another ensemble is mandatory for mobile receivers.

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4.7 Response to conditional access (CA) services

4.7.1 Introduction

In DAB some Service Components belonging to a Service may be individually scrambled to make these components incomprehensible for unauthorised users.

4.7.2 Requirements for DAB receivers without CA capabilities

These receivers shall either make scrambled Service Components unavailable for selection or indicate their presence together with the fact that they are scrambled and thus not accessible. Special care has to be taken in the transition from "unscrambled" to "scrambled". When this occurs on one of the selected Service Components, the receiver shall mute the audio and give an appropriate indication.

Note: For DAB receivers with CA capabilities, see clause 6.2

4.8 Output for audio and other services

4.8.1 Introduction

The DAB system provides both Programme and Data Services.

Programme Services comprise of an audio Primary Service Component and (optionally) additional Secondary Service Components. Each audio Service Component can also contain PAD (Programme Associated Data) which is used to convey information intimately linked to the sound programme in terms of content and synchronisation. DRC (Dynamic Range Control) is an example of a PAD application.

Data Services comprise of non-audio Primary Service Components and may optionally have additional Secondary Service Components. Two types of data services are defined:

- a) General Data Service Component types such as:
 - paging
 - TMC Traffic Message Channel
 - EWS Emergency Warning Systems
 - ITTS Interactive Text Transmission Systems
 - non interactive point to multipoint data services
- b) Specific Service Component types for Closed User Groups

4.8.2 Requirements

The DAB receiver shall output the audio signal to e.g. loudspeakers and/or provide other outputs via one of the interfaces specified in chapter 5.

4.9 Transparency for copy protection

The DAB system allows transmission of copy protection information within the header of the ISO/IEC-coded audio bit stream. The information shall be transferred, together with the complete header, to the digital audio output as described in 5.3, 5.4 or 5.5.

4.10 Coding profiles (Minimum implementation of specified coding profiles)

The channel decoder shall support all protection profiles and shall be able to decode at least one stereo audio programme with a bit rate of up to 256 kbit/sec.

5 Interfaces:

If any of the following interfaces are applied, the described standardised versions should be used. Alternative and dedicated solutions may be used for in-car or similar systems.

5.1 RF input

Home and portable DAB receiver	75 Ω	according to	IEC 169-2
Car DAB receiver	50 Ω		not fixed yet
(A in Figure 1)			

5.2 Analogue audio interface [IEC 268-15]

(I, J and H in Figure 1)

5.3 Digital audio interface [IEC 958] (D in Figure 1)

5.4 Coded audio interface

The DAB receiver may (optionally) provide an interface/output of the error-corrected but source-coded bit stream of one audio sub-channel. The audio coding is based on ISO/IEC 11172-3. (G in figure 1)

An interface description is under consideration (IEC 1937).

5.5 General digital interface (F in figure 1)

See EN 50255.

5.6 Conditional access interface

The conditional access interface is under consideration.

6. Options

The following features are not mandatory for a basic receiver, but are recommended.

6.1 Receiver display:

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It is recommended that at least 8 characters be used, and the following information be displayed:

- service label
- service component label
- programme type
- language
- ensemble label
- dynamic label segment
- copy protection
- status for conditional access
- local flag
- region label
- information on reception quality
- time and date

6.2 Other features

- national character sets
- switching to alternative FM frequencies and linking
- mono / stereo / joint stereo - dual channel switching
- selective volume adjustment for music and speech
- Dynamic Range Control (DRC)
- reaction to announcements:
 - alarm,
 - traffic,
 - weather,
 - e t c.
- switching to regional services using TII (Transmitter Identification Information)
- switching to regional announcements using TII