



SLOVENSKI STANDARD
SIST EN 50248:2003

01-oktober-2003

BUXca Yý U
SIST EN 50248:1999

Characteristics of DAB receivers

Characteristics of DAB receivers

Eigenschaften von DAB-Empfängern

Caractéristiques du récepteur DAB

ITeH STANDARD PREVIEW
(standards.iteh.ai)

Ta slovenski standard je istoveten z: ~~SIST EN 50248~~ EN 50248:2001

<https://standards.iteh.ai/catalog/standards/sist/0cc275bf-4069-4965-916c-599dd38de1ee/sist-en-50248-2003>

ICS:

33.160.20 Radijski sprejemniki Radio receivers

SIST EN 50248:2003 **en**

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 50248:2003](#)

<https://standards.iteh.ai/catalog/standards/sist/0cc275bf-4069-4965-916c-599dd38dc1cc/sist-en-50248-2003>

EUROPEAN STANDARD

EN 50248

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 2001

ICS 33.160.20

Supersedes EN 50248:1997

English version

Characteristics of DAB receivers

Caractéristiques du récepteur DAB

Eigenschaften von DAB-Empfängern

This European Standard was approved by CENELEC on 2000-08-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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, Consumer equipment for entertainment and information and related sub-systems.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 50248 on 2000-08-01.

This European Standard supersedes EN 50248:1997.

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) 2002-02-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2003-08-01

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

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN 50248:2003](https://standards.iteh.ai/catalog/standards/sist/0cc275bf-4069-4965-916c-599dd38dc1cc/sist-en-50248-2003)

<https://standards.iteh.ai/catalog/standards/sist/0cc275bf-4069-4965-916c-599dd38dc1cc/sist-en-50248-2003>

Contents

1	Scope.....	4
2	Normative references	4
3	Terms and definitions	5
4	Basic implementation and functional performance requirements	5
4.1	Audio decoder	5
4.2	Automatic mode selection.....	7
4.3	Frequency bands	7
4.4	Service selection	7
4.5	Receiver reactions to a multiplex re-configuration.....	8
4.6	Automatic switching to another ensemble	8
4.7	Response to conditional access (CA) services	8
4.8	Output for audio and other services.....	8
4.9	Transparency for copy protection	9
4.10	Coding profiles (Minimum implementation of specified coding profiles).....	9
5	Interfaces	9
5.1	General.....	9
5.2	RF input.....	9
5.3	Analogue audio interface [EN 61938].....	9
5.4	Digital audio interface [IEC 60958-3].....	9
5.5	Coded audio interface [IEC 61937].....	9
5.6	General digital interface (F in Figure 1).....	10
5.7	Conditional access interface.....	10
6	Options.....	10
6.1	General.....	10
6.2	Receiver display	10
6.3	Other features	10
7	Minimum performance levels and measuring methods	11
7.1	General conditions.....	11
7.2	Audio part - Performance requirements	11
7.3	R.F. part	12
Annex A	(informative) Recommended centre frequencies for DAB	18
Annex B	(normative) Characteristics of a Rayleigh channel.....	21
Annex C	(informative) Bibliography	26

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 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate 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 European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 50255, *Digital Audio Broadcasting system – Specification of the receiver data interface (RDI)*

EN 55013¹⁾, *Limits and methods of measurement of radio disturbance characteristics of broadcast receivers and associated equipment (CISPR 13, mod)*

EN 55020¹⁾, *Electromagnetic immunity of broadcast receivers and associated equipment - Limits and methods of measurement of immunity characteristics of sound and television broadcast receivers and associated equipment*

EN 60169-24, *Radio-frequency connectors - Part 24: Radio-frequency coaxial connectors with screw coupling, typically for use in 75 ohm cable distribution systems (Type F)*

EN 60315-4, *Methods of measurement on radio receivers for various classes of emission - Part 4: Receivers for frequency-modulated sound broadcasting emissions*

EN 61606, *Audio and audiovisual equipment – Digital audio parts - Basic methods of measurement of audio characteristics (IEC 61606)*

EN 61938, *Audio, Video and audiovisual systems – Interconnection and matching values. Preferred matching values of analogue signals (IEC 61938)*

EN 300 401, *Digital Audio Broadcasting to mobile, portable and fixed receivers. (DAB system standard).*

IEC 60169-10, *Radio-frequency connectors - Part 10: R.F. coaxial connectors with inner diameter of outer conductor 3 mm (0,12 in) with snap-on coupling - Characteristic impedance 50 ohms (Type SMB)*

IEC 60315-1, *Methods of measurement on radio receivers for various classes of emission - Part 1: General considerations and methods of measurement, including audio-frequency measurement (harmonized as HD 560.1)*

IEC 60958-3, *Digital audio interface - Part 3 : Consumer applications*

IEC 61937, *Interface for non-linear PCM encoded audio bitstreams applying to IEC 60958*

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*

¹⁾ An amendment concerning digital receivers is in preparation.

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*

ETSI TR 101 496-2, *Digital Audio Broadcasting system (DAB) - Guidelines and rules of implementation and operation. Volume 2: System feature.*

ETSI TS 101 757, *Digital Audio Broadcasting system (DAB) - Conformance Testing for DAB Audio*

3 Terms and definitions

For the purpose of this European Standard, the following definitions apply.

Other definitions, abbreviations and symbols are solely related to DAB unless stated otherwise.

3.1

DAB receiver

receiver which is intended to receive and decode programmes transmitted according to the DAB system specification EN 300 401

NOTE Figure 1 shows an example of a functional block diagram of a DAB Receiver according to EN 300 401(for information only).

3.2

minimum requirement

is the lowest value that a DAB receiver should fulfil in order to be called a DAB receiver. It takes into account low cost receivers

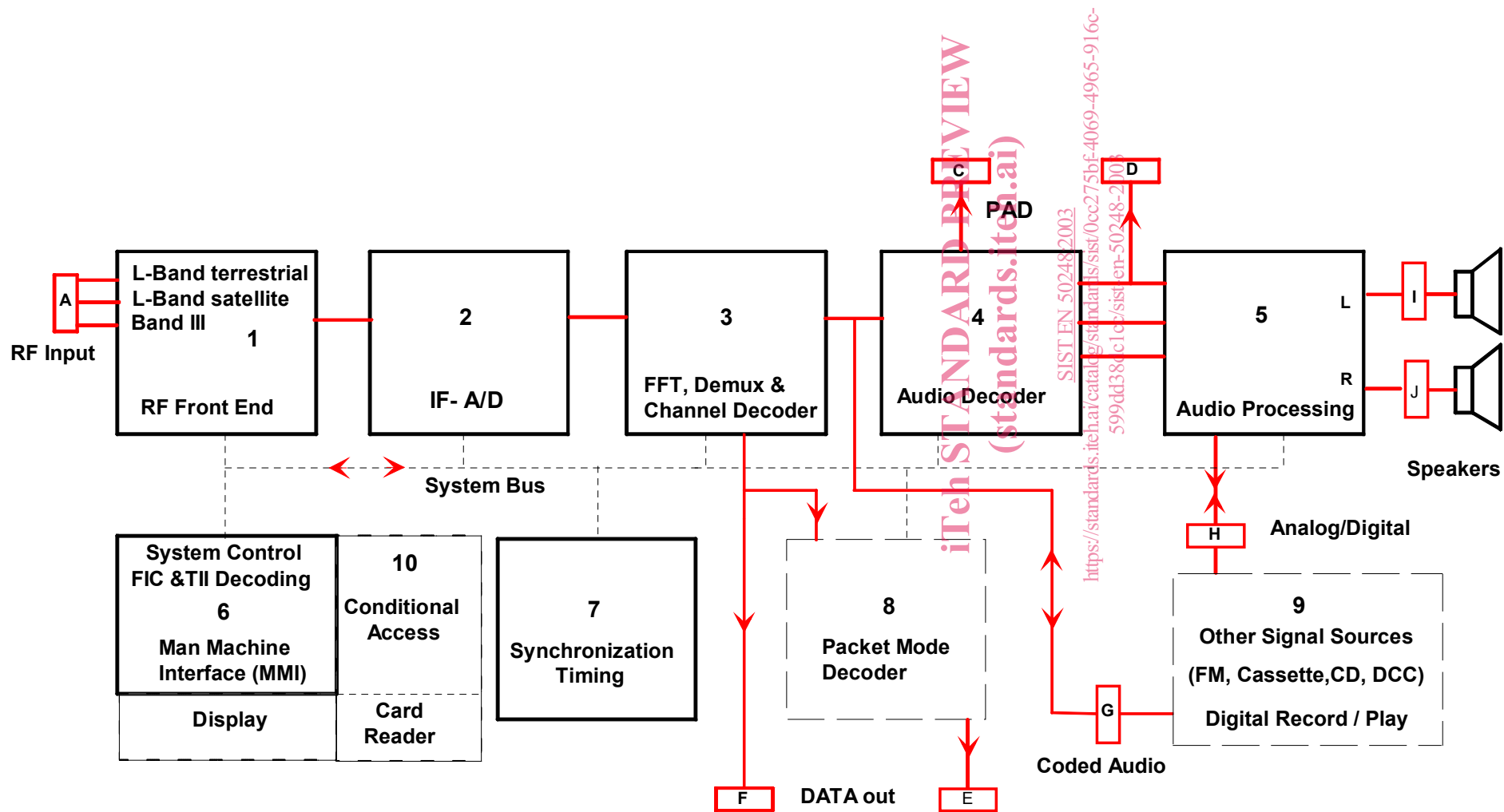
4 Basic implementation and functional performance requirements

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 EN 300 401. The conformity is described in ETSI TS 101 757. 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 EN 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/s are optional).



Block 8 and 10 are optional, block 9 is not part of the DAB receiver

Figure 1 - Example of a functional block diagram of a DAB receiver

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 EN 300 401 (see clause 15, 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.

4.3 Frequency bands

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: 1 452 MHz to 1 492 MHz (see note 1)

Other bands: see note 2

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 1 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".

NOTE 2 For specific demands (e.g. cable distribution etc.) other frequencies can optionally be used.

4.4 Service selection

4.4.1 Introduction

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

Each service has one or more service components. 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 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 level 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 as described in ETSI TR 101 496-2.

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

4.6 Automatic switching to another ensemble

In order to allow service following of a particular DAB service the ability of a mobile DAB receiver to switch automatically to another ensemble is mandatory. Service following should be as described in ETSI TR 101 496-2.

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 CA capabilities are optional (see clause 6.)

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.

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 clause 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 5.4, 5.5 or 5.6.

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/s.

5 Interfaces

5.1 General

If any of the following interfaces are applied, the described standardised versions should be used.

Dedicated solutions, which do not require connections to other standard products, may use special interfaces.

5.2 RF input

(A in Figure 1)

Domestic DAB receiver:	75 Ohms (female)	acc. to EN 60169-24 (type "F")
Car DAB receiver:	50 Ohms (male)	acc. to IEC 60169-10 (type "SMB")
Portable DAB receiver:	75 Ohms (female)	acc. to EN 60169-24 (type "F")

Antenna interface specifications for receivers designed to support an active antenna:

Frequency range	SIST EN 50248:2003	Band III and L-Band
Antenna connector	https://standards.iteh.ai/catalog/standards/sist/0cc2750f-4007-4905-910c-599dd38dc1cc/sist-en-50248-2003	IEC 60169-10 (SMB, male 50 Ohms)
Remote power supply		8,8 V – 16 V
Maximum current		< 100 mA
Maximum input power at receiver		Band III: -10 dB(mW) + Gain L-Band: -25 dB(mW) + Gain

Typical values for the active antenna:

Noise figure	< 3 dB
Gain (without cable loss)	6 dB
Intermodulation (IM3) *	40 dBc

*Measured with a two-tone signal: $\Delta f = 100$ kHz, total power at the receiver = -25 dB(mW).

5.3 Analogue audio interface [EN 61938]

(I, J and H in Figure 1)

5.4 Digital audio interface [IEC 60958-3]

(D in Figure 1)

5.5 Coded audio interface [IEC 61937]

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 or ISO/IEC 13818-3.

(G in Figure 1)