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# Foreword

This Technical Specification (TS) has been produced by Joint Technical Committee (JTC) Broadcast 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 Broadcast was established in 1990 to co-ordinate the drafting of standards in the specific field of broadcasting and related fields. Since 1995 the JTC Broadcast 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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The Eureka Project 147 was established in 1987, with funding from the European Commission, to develop a system for the broadcasting of audio and data to fixed, portable or mobile receivers. Their work resulted in the publication of European Standard, ETSI EN 300 401 [1], for DAB (see note 2) which now has worldwide acceptance.

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

The DAB family of standards is supported by World DAB, an organization with members drawn from broadcasting organizations and telecommunication providers together with companies from the professional and consumer electronics industry.

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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).

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## Introduction

The present document is one of a set associated with DAB. ETSI EN 300 401 [1] describing the transmitted signal, the interface between the broadcaster's transmitters and the listener's receiver. The associated documents, ETSI EN 300 797 [2], ETSI EN 300 798 [3] and ETSI EN 300 799 [4] describe additional interfaces, which can be used by broadcasters or network providers to build DAB collection and distribution networks. In particular the document ETSI EN 300 797 [2] establishes a standard way for transporting Service Components, Service Information and control messages between two entities in a DAB collection network. Because of the openness and flexibility of the Service Transport Interface (STI) standard there is uncertainty regarding the implementation of it. This applies to interoperability between devices from different suppliers. Practical broadcast scenarios do not always require to implement the full standard, which creates the problem that different suppliers might implement different subsets of ETSI EN 300 797 [2].

To overcome this problem and to fully exploit the great potential of the DAB system, the subject of the present document is to describe implementation levels of the STI standard and to outline their usage.

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# 1 Scope

The present document establishes guidance in implementation and usage of the functionality described in the STI standard ETSI EN 300 797 [2]. Subsets of the STI standard, called STI Levels, are defined in order to make interoperable solutions possible for different suppliers of STI devices. The present document defines the minimum functionality an upstream or downstream entity provides on each level to be considered compliant with that level.

This version of the present document is aligned with V2.1.1 of ETSI EN 300 401 [1].

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## 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 300 401 (V2.1.1): "Radio broadcasting systems; Digital Audio Broadcasting (DAB) to mobile, portable and fixed receivers".
- [2] ETSI EN 300 797: "Digital Audio Broadcasting (DAB); Distribution interfaces; Service Transport Interface (STI)".
- [3] ETSI EN 300 798 (V1.1.1): "Digital Audio Broadcasting (DAB); Distribution interfaces; Digital baseband In-phase and Quadrature (DIQ) interface".
- [4] ETSI ETS 300 799 (1997): "Digital Audio Broadcasting (DAB); Distribution interfaces; Ensemble Transport Interface (ETI)".
- [5] Recommendation ITU-T G.704: "Synchronous frame structures used at 1544, 6312, 2048, 8448 and 44 736 kbit/s hierarchical levels".
- [6] Recommendation ITU-T G.703: "Physical/electrical characteristics of hierarchical digital interfaces".

### 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.

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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] IETF RFC 1700 (October 1994): "Assigned Numbers", STD 2, Reynolds, J. and J. Postel.

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## 3 Definitions and abbreviations

### 3.1 Definitions

For the purposes of the present document, the terms and definitions given in ETSI EN 300 401 [1], ETSI EN 300 797 [2] and the following apply:

**STI Level:** subset of overall STI functionality described by ETSI EN 300 797 [2]

### 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in ETSI EN 300 401 [1], ETSI EN 300 797 [2] and the following apply:

API	Application Programming Interface
DNS	Dynamic Name Server
EP	Ensemble Provider
IANA	Internet Assigned Numbers Association
IP	Internet Protocol
ISDN	Integrated Services Digital Network
SP	Service Provider
TCP	Transport Control Protocol
VPN	Virtual Private Network

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## 4 STI Levels

### 4.0 Introduction

The STI Levels describe the STI functionality, i.e. STI-D stream types and STI-C message sets and their usage, that STI entities shall provide to be considered STI level compliant. The levels shall be subsets of ETSI EN 300 797 [2] with respect to STI-D(LI) and STI-C(LI) functionality.

A total of three levels is defined. The level requiring the least functionality is called level 1. Higher levels shall fully comprise the lower ones. The levelling proposed in the present document is only valid for the logical part of ETSI EN 300 797 [2] and does not apply to physical interfaces. Thus an STI capable device may be equipped with one or more physical interfaces, each being capable of providing one of the STI Levels as defined in the present document.

### 4.1 STI-D(LI) Stream Types

#### 4.1.0 General

The STI-D(LI) data stream types classified in ETSI EN 300 797 [2], clause 4.2, are divided into two parts, basic stream types and optional stream types.

#### 4.1.1 Basic Stream Types

##### 4.1.1.0 Definition

Basic stream types are:

- MSC sub-channel audio stream service component;
- MSC sub-channel data stream service component;

- MSC sub-channel data stream made of one or more packet mode service components (and padding);
- FIC FIG stream Service Information.

Table 1 shows which TID and TIDext shall be supported.

**Table 1: TID/TIDext supported as basic stream types**

TID	TIDext	Significance
0	0	MSC audio stream
	1	MSC data stream
	2	MSC packet mode stream
4	0	Service Information

#### 4.1.1.1 MSC sub-channel streams

The basic stream types shall provide correct handling of individual MSC streams as described in ETSI EN 300 797 [2], clause 5.9.1.

#### 4.1.1.2 FIC FIG stream

The basic stream types shall provide correct handling of FIC FIG streams carried in STI-D(LI) as described in ETSI EN 300 797 [2], clause 5.9.3.

### 4.1.2 Optional Stream Types

Other stream types than those defined as basic are optional on all STI Levels:

- MSC sub-channel contribution packet mode data service component;
- FIC FIG stream CA information;
- FIC FIB stream asynchronous FIB insertion;
- FIC FIB stream synchronous FIB insertion.

## 4.2 STI Level 1

### 4.2.0 General

This clause defines the minimum functionality required by an STI upstream or downstream entity to be considered conformant to STI Level 1. Only STI-D(LI) basic stream types are supported. Control message exchange between upstream and downstream entities is not included. Therefore no support of STI-C(LI) messages is required. Usage of this level shall assume a configuration agreement between the upstream and downstream entities.

#### 4.2.1 STI-D(LI) requirements

All basic stream types as defined in clause 4.1.1 shall be supported in downstream entities. At least one basic stream type shall be supported in upstream entities.

#### 4.2.2 STI-C(LI) requirements

In STI Level 1 no setup and control messages can be exchanged between an upstream and downstream entity. Therefore no support of STI-C(LI) shall be required.

## 4.3 STI Level 2

### 4.3.0 General

This clause defines the minimum functionality required by an STI upstream or downstream entity to be considered conformant to STI Level 2. The minimum functionality required in level 1 shall be comprised on this level. On STI Level 2 the possibility to exchange certain STI-C(LI) messages between upstream and downstream entities shall be supported. Extending the functionality provided on STI Level 1, STI Level 2 supports seamless and coordinated dynamic reconfiguration as well as the usage of FIG files.

#### 4.3.1 STI-D(LI) requirements

The STI-D(LI) requirements of STI Level 1 shall be comprised, i.e. all basic stream types as defined in clause 4.1.1 shall be supported in downstream entities. At least one basic stream type shall be supported in upstream entities.

#### 4.3.2 STI-C(LI) requirements

In STI Level 2 exchange of control messages shall be supported. The required functionality comprises seamless dynamic reconfiguration of the DAB multiplex initiated by the upstream entity, the possibility to define new configurations, exchange of error messages and frame counter information. FIG files in addition to FIG streams may be used to provide FIC content. Therefore the following message classes, as defined in ETSI EN 300 797 [2], shall be supported:

- Action messages, i.e. message class **ACTION**;
- Configuration messages, i.e. message class **CONFIG**;
- FIG file messages, i.e. message class **FIGFILE**;
- Information messages, i.e. message class **INFORMATION**;
- Supervision messages, i.e. message class **SUPERVISION**.

NOTE: Only the reconfiguration initiation by the upstream entity is mandatory. The possibility of reconfiguration enforcement on upstream entities from the downstream entity is optional. This means that not all the functionality of message class **ACTION** is required (see also annex A).

## 4.4 STI Level 3

### 4.4.0 General

This clause defines the minimum functionality required by an STI upstream or downstream entity to be considered conformant to STI Level 3. The minimum functionality required on the lower levels shall be comprised on this level. Extending the functionality provided on STI Level 2, STI Level 3 supports the possibility to exchange STI-C(LI) messages of the RESOURCE class between upstream and downstream entities.

#### 4.4.1 STI-D(LI) requirements

The STI-D(LI) requirements of STI Levels 1 and 2 shall be comprised, i.e. all basic stream types as defined in clause 4.1.1 shall be supported in downstream entities. At least one basic stream type shall be supported in upstream entities.