ETSI TS 103 176 V1.2.1 (2016-05)

Digital Audio Broadcasting (DAB); Rules of implementation; Service information features

Reference
RTS/JTC-DAB-78

Keywords
audio, broadcasting, coding, DAB, digital

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:
http://www.etsi.org/standards-search

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status.
Information on the current status of this and other ETSI documents is available at
https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx

If you find errors in the present document, please send your comment to one of the following services:
https://portal.etsi.org/People/CommiteeSupportStaff.aspx

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.
The content of the PDF version shall not be modified without the written authorization of ETSI.
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2016.
© European Broadcasting Union 2016.
All rights reserved.

DECT™, **PLUGTESTS**™, **UMTS**™ and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.
3GPP™ and **LTE**™ are Trade Marks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.
GSM® and the GSM logo are Trade Marks registered and owned by the GSM Association.

Contents

Intellectual Property Rights 8
Foreword 8
Modal verbs terminology 8
1 Scope 9
2 References 9
2.1 Normative references 9
2.2 Informative references 9
3 Definitions and abbreviations 9
3.1 Definitions 9
3.2 Abbreviations 10
4 Overview of service information FIGs 11
5 Service following 12
5.1 Introduction 12
5.1.0 General 12
5.1.1 Service linking information 13
5.1.2 OE Services 14
5.1.3 Frequency information 14
5.2 Service linking 14
5.2.0 General 14
5.2.1 Short form - Activation state and change event indication 15
5.2.2 Long form - Database definition 15
5.2.3 Linkage sets 15
5.2.4 Signalling a link 17
5.2.4.0 General 17
5.2.4.1 Defining and redefining a linkage set 17
5.2.4.2 Maintaining the linkage set 17
5.2.4.3 Changing the activation state of linkage sets 17
5.2.5 Receiver behaviour for a link 18
5.2.5.0 General 18
5.2.5.1 Reaction to CEI 18
5.2.5.2 Reaction to definition 18
5.2.5.3 Reaction to activation and deactivation 18
5.3 OE Services 19
5.3.0 General 19
5.3.1 Short form - Change event indication 19
5.3.2 Long form - Database definition 19
5.3.3 OE Services fields 19
5.3.4 Signalling 19
5.3.4.0 General 19
5.3.4.1 Defining and redefining the database 19
5.3.4.2 Maintaining the database 19
5.3.5 Receiver behaviour 20
5.3.5.0 General 20
5.3.5.1 Reaction to CEI 20
5.3.5.2 Reaction to definition 20
5.4 Frequency information 20
5.4.0 General 20
5.4.1 Short form - Change event indication 20
5.4.2 Long form - Database definition 20
5.4.3 Frequency information fields 20
5.4.4 Signalling 21
5.4.4.0 General 21
5.4.4.1 Defining and redefining the database 21
5.4.4.2 Maintaining the database 21

5.4.5 Receiver behaviour 21
5.4.5.0 General 21
5.4.5.1 Reaction to CEI 21
5.4.5.2 Reaction to definition 22
5.5 Transmission model 22
5.5.1 DAB / DAB service following 22
5.5.2 DAB / FM-RDS service following 22
5.6 Receiver Reference Model 23
5.6.0 General 23
5.6.1 Reception Monitoring 23
5.6.2 Information base 23
5.6.3 Service Following Process 24
5.6.3.1 Overview 24
5.6.3.2 Stage 1: Find same service 25
5.6.3.3 Stage 2: Follow hard links 25
5.6.3.4 Stage 3: Follow soft links 25
5.6.3.5 Handling of bearer system transitions 26
5.6.4 Stored services ("presets") 26
5.6.5 Linkage sets 27
5.6.6 Linkage set management 27

6 Service lists 29
6.1 Introduction 29
6.2 Managing ensemble changes 29
6.2.1 Describing an ensemble 29
6.2.2 What is the service list 29
6.2.3 Establishment of the service list 30
6.2.4 Maintenance of the service list 31
6.2.5 Signalling conventions 32
6.3 Adding service elements to an ensemble 32
6.3.1 Introduction 32
6.3.2 Signalling 33
6.3.2.1 Preparation phase 33
6.3.2.2 Reconfiguration phase 33
6.3.2.3 Consolidation phase 33
6.3.3 Receiver behaviour 34
6.3.3.1 General 34
6.3.3.2 Response to signalling 34
6.4 Removing service elements from an ensemble 34
6.4.1 Introduction 34
6.4.2 Signalling 35
6.4.2.1 Preparation phase 35
6.4.2.2 Reconfiguration phase 36
6.4.2.3 Consolidation phase 36
6.4.3 Receiver behaviour 37
6.4.3.1 General 37
6.4.3.2 Response to signalling 37
6.5 Changing the identity or source of a service 38
6.5.1 Introduction 38
6.5.2 Signalling 38
6.5.2.1 Preparation phase 38
6.5.2.2 Reconfiguration phase 39
6.5.2.3 Consolidation phase 39
6.5.3 Receiver behaviour 39
6.5.3.1 General 39
6.5.3.2 Response to signalling 40
6.6 Changing the label of a service element 41
6.6.1 Introduction 41
6.6.2 Signalling 41
6.6.3 Receiver behaviour 41

Annex A (informative): Service following - use case examples 42

A.1 DAB to DAB link in Multi-Frequency Networks 42
A.1.1 Problem Description 42
A.1.2 Concept 42
A.1.3 Signalling 42
A.1.3.1 FIG0/6 Service linking information 42
A.1.3.2 FIG0/24 OE Services 42
A.1.3.3 FIG0/21 Frequency Information 42
A.1.4 Receiver Behaviour 43
A.1.4.1 Single tuner device 43
A.1.4.2 Dual tuner device 43

A.2 Linking to the same service on different ensembles 43
A.2.1 Problem Description 43
A.2.2 Concept 44
A.2.3 Signalling 44
A.2.3.1 FIG0/6 Service linking information 44
A.2.3.2 FIG0/24 OE Services 44
A.2.3.3 FIG0/21 Frequency Information 45
A.2.4 Receiver Behaviour 45

A.3 Linking regional variations of a service on different ensembles 45
A.3.1 Problem Description 45
A.3.2 Concept 46
A.3.3 Signalling 46
A.3.3.1 FIG0/6 Service linking information 46
A.3.3.2 FIG0/24 OE Services 49
A.3.3.3 FIG0/21 Frequency Information 50
A.3.4 Receiver Behaviour 50

A.4 Linking technology variations of a service on different ensembles 51
A.4.1 Problem Description 51
A.4.2 Concept 52
A.4.3 Signalling 52
A.4.3.1 FIG0/6 Service linking information 52
A.4.3.2 FIG0/24 OE Services 52
A.4.3.3 FIG0/21 Frequency Information 53
A.4.4 Receiver Behaviour 53

A.5 Soft linking of services 54
A.5.1 Problem Description 54
A.5.2 Concept 55
A.5.3 Signalling 55
A.5.3.1 FIG0/6 Service linking information 55
A.5.3.2 FIG0/24 OE Services 56
A.5.3.3 FIG0/21 Frequency Information 56
A.5.4 Receiver Behaviour 56

A.6 Linkage of DAB and FM-RDS services 57
A.6.1 Problem Description 57
A.6.2 Concept 57
A.6.3 Signalling 58
A.6.3.1 FIG0/6 Service linking information 58
A.6.3.2 FIG0/24 OE Services 58
A.6.3.3 FIG0/21 Frequency Information 58
A.6.4 Receiver Behaviour 58

A.7 Linkage of DAB and FM-RDS services with time varying network relationships 59
A.7.1 Problem Description 59
A.7.2 Concept 60
A.7.3 Signalling 60
A.7.3.1 FIG0/6 Service linking information 60
A.7.3.2 FIG0/24 OE Services 60
A.7.3.3 FIG0/21 Frequency Information 60
A.7.4 Receiver Behaviour 60

A.8 Preventing implicit linkage to FM-RDS 60
A.8.1 Problem Description 60
A.8.2 Concept 60
A.8.3 Signalling 61
A.8.3.1 FIG0/6 Service linking information 61
A.8.3.2 FIG0/24 OE Services 61
A.8.3.3 FIG0/21 Frequency Information 61
A.8.4 Receiver Behaviour 61

Annex B (informative): Service following - Transition from existing implementations 62

Annex C (informative): Service lists - use case examples 63

C.1 New service on air 63
C.1.1 Use case description 63
C.1.2 Concept 63
C.1.3 Signalling 63
C.1.3.1 Preparation phase 63
C.1.3.2 Reconfiguration phase 63
C.1.3.3 Consolidation phase 64
C.1.4 Receiver behaviour 64

C.2 Continuous service is removed (with transfer) 64
C.2.1 Use case description 64
C.2.2 Concept 64
C.2.3 Signalling 64
C.2.3.1 Preparation phase 64
C.2.3.2 Reconfiguration phase 65
C.2.3.3 Consolidation phase 65
C.2.4 Receiver behaviour 65

C.3 New Part-time service on air 66
C.3.1 Use case description 66
C.3.2 Concept 66
C.3.3 Signalling 66
C.3.3.1 Preparation phase 66
C.3.3.2 Reconfiguration phase 67
C.3.3.3 Consolidation phase 67
C.3.4 Receiver behaviour 67

C.4 Part-time service is on-air 67
C.4.1 Use case description 67
C.4.2 Concept 67
C.4.3 Signalling 67
C.4.3.1 Preparation phase 67
C.4.3.2 Reconfiguration phase 68
C.4.3.3 Consolidation phase 68
C.4.4 Receiver behaviour 68

C.5 Part-time service is off-air 68
C.5.1 Use case description 68
C.5.2 Concept 68
C.5.3 Signalling 69
C.5.3.1 Preparation phase 69
C.5.3.2 Reconfiguration phase 69
C.5.3.3 Consolidation phase 69
C.5.4 Receiver behaviour 69

C.6 SId change within an ensemble 69
C.6.1 Use case description 69
C.6.2 Concept 70
C.6.3 Signalling 70
C.6.3.1 Preparation phase 70
C.6.3.2 Reconfiguration phase 70

C.6.3.3 Consolidation phase 70
C.6.4 Receiver behaviour 71
C.7 Service moves to a new ensemble with SId change 71
C.7.1 Use case description 71
C.7.2 Concept 71
C.7.3 Signalling 72
C.7.3.1 Preparation phase 72
C.7.3.2 Reconfiguration phase 73
C.7.3.3 Consolidation phase 73
C.7.4 Receiver behaviour 74
Annex D (informative): Service lists - presentation 75
D.1 Entries in the service list 75
D.2 Handling of part-time service components 75
D.3 Automatic updates to the service list 75
D.4 Character sets in the service list 76
D.5 Sorting of the service list 76
D.6 Presentation of secondary service components 77
D.7 Updating an ensemble from one frequency to another 77
D.8 Handling of unavailable service elements 77
D.9 Combined service list from multiple bearer systems 78
Annex E (informative): Service lists - expected receiver behaviour 79
E.1 Domestic receiver implementations 79
E.1.1 Introduction 79
E.1.2 Addition of service elements 79
E.1.3 Removal of service elements 80
E.1.4 Changed identity or ensemble 81
E.1.5 Multi-tuner domestic receiver 81
Annex F (normative): Service Component Information 82
History 85

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (https://ipr.etsi.org/).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

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.

European Broadcasting Union
CH-1218 GRAND SACONNEX (Geneva)
Switzerland
Tel: +41 22 717 21 11
Fax: +41 22 717 24 81

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.

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 defines rules of implementation for certain service information features. These rules have been developed to provide a reliable and consistent experience for digital radio listeners; they provide implementation details for how the Fast Information Channel (FIC) signalling is used and how receivers will interpret and behave in response to receiving the FIC signalling. The rules defined in the present document supersede the informative guidance given in ETSI TR 101 496 [i.1] for the Fast Information Groups (FIGs) contained herein. In addition, some clarifications are provided for ETSI EN 300 401 [1] where a number interpretations may appear equally valid: in each case this is mentioned specifically. Future versions of ETSI EN 300 401 [1] will be modified to include these clarifications.

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: "Radio Broadcasting Systems; Digital Audio Broadcasting (DAB) to mobile, portable and fixed receivers".

[2] ETSI TS 101 756: "Digital Audio Broadcasting (DAB); Registered Tables".

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 101 496 (all parts): "Digital Audio Broadcasting (DAB); Guidelines and rules for implementation and operation".

[i.2] ISO 10646: "Information technology -- Universal Coded Character Set (UCS)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

Change Event Indication (CEI): set of FIG fields with particular values to indicate a change of database content for certain service information features