

# ETSI TS 103 689 V1.1.1 (2019-11)



## Digital Audio Broadcasting (DAB); Filtered Information Service (FIS); Application specification

Full standard preview  
Full catalog/standards/etsi-ts-103-689-1-1-11  
<https://standards.iteh.ai/catalog/standards/etsi-ts-103-689-1-1-11>  
407a-8585-a0f626c41498/etsi-ts-103-689-1-1-11



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**Reference**

DTS/JTC-DAB-99

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**Keywords**

broadcasting, DAB, digital, radio, XML

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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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# 1 Scope

The present document establishes an optional extension to the broadcast standard for Digital Audio Broadcasting (DAB) system.

The Filtered Information Service (FIS) is a data application that allows service providers to deliver information to groups of receivers with configurable filters, for example, text language, model number, date of registration, etc. The XML framework and transport specification are defined.

---

## 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 301 234 (V2.1.1): "Digital Audio Broadcasting (DAB); Multimedia Object Transfer (MOT) Protocol".
- [3] ETSI TS 101 756: "Digital Audio Broadcasting (DAB); Registered Tables".
- [4] ISO 8601: "Data elements and interchange formats -- Information interchange -- Representation of dates and times".
- [5] ISO/IEC 10646: "Information technology - Universal Coded Character Set (UCS)".
- [6] IETF RFC 2045: "Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies".
- [7] ISO 3166-1: "Codes for the representation of names of countries and their subdivisions - Part 1: Country codes".
- [8] "GeoRSS: Geographically Encoded objects for RSS feeds".

NOTE: Available at <http://www.georss.org>.

## 2.2 Informative references

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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 TS 101 499: "Hybrid Digital Radio (DAB, DRM, RadioDNS); SlideShow; User Application Specification".

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## 3 Definition of terms, symbols and abbreviations

### 3.1 Terms

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

**display language:** user defined language used for display of text elements

**key:** unique identifier used to address receiver devices allocated to a particular company

### 3.2 Symbols

Void.

### 3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

DAB	Digital Audio Broadcasting
FEC	Forward Error Correction
FIG	Fast Information Group
FIS	Filtered Information Service
GPS	Global Positioning System
HMI	Human Machine Interface
ISO	International Organization for Standardization
JFIF	JPEG File Interchange Format
JPEG	Joint Photographic Experts Group
MCI	Multiplex Configuration Information
MIME	Multimedia Internet Message Extensions
MJD	Modified Julian Date
MOT	Multimedia Object Transfer
MSC	Main Service Channel
OEM	Original Equipment Manufacturer
PNG	Portable Network Graphics
POI	Point-Of-Interest
URL	Uniform Resource Locator
UTF	Unicode Transformation Format
XML	eXtensible Markup Language
XSD	XML Schema Definition

## 4 Introduction

The Filtered Information Service (FIS) is an application used to send messages to suitably equipped DAB devices via the broadcast radio network. It may be used by a radio manufacturer, car manufacturer or third-party to disseminate information to their clients. The FIS allows the information to be identified by company defined filters in order to target particular information to particular device groups. The information is primarily text based, but images may also be provided.

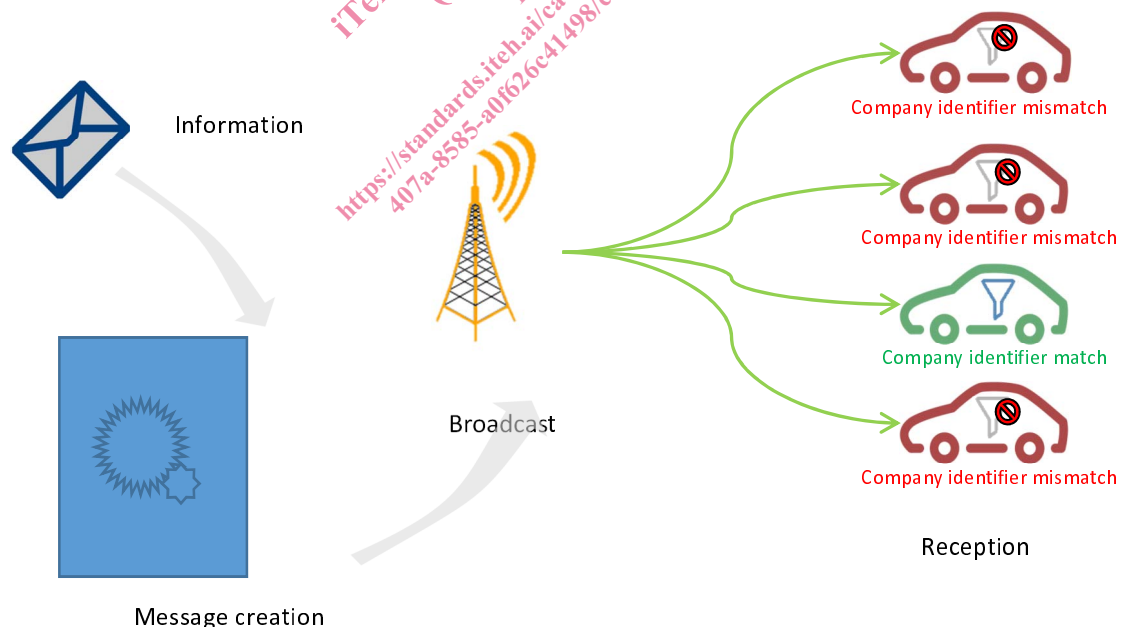
FIS use cases can be very diverse, from kitchen radios to a company car fleet.

- EXAMPLE 1:** A kitchen radio maker provides news that updated software is available for download via an internet address, or that it has new models available.
- EXAMPLE 2:** An OEM wishes to reach vehicle owners about important information such as a dealer recall but has lost contact with some owners due to vehicle resale; the information may be targeted at a particular range of vehicles based on the model year, transmission system, etc.
- EXAMPLE 3:** A car rental company provides general messages to groups of vehicles based on their location, age, etc. and specific details of individual rental issues which are only displayed in the corresponding vehicle.

Since the FIS uses the DAB broadcast network, there is no need for special infrastructure to transmit the FIS information. The broadcaster or network operator embeds messages into the DAB broadcast according to the definitions provided by the present document. The receiver implements security and message filtering mechanisms in order to display the appropriate information. It is not necessary for the receiver to have continuous reception of the FIS, because the information is cyclically repeated and cached in the receiver.

Each FIS has a unique company identifier, called a key, which allows receivers to focus on only the messages of interest. Messages may be provided securely to end-user devices by the use of encryption. A FIS consists of an XML document and may include additional image files.

An overview of the FIS is provided in figure 1.



**Figure 1: Overview of the FIS**

An entity can direct a message to a dedicated subset of its own receivers by defining and using filters linked to the product characteristics that the company wants to address.

- EXAMPLE 4:** An OEM can direct messages to specific car models from specific registration periods.



It is the company responsibility to define its own filters in a filter definition file. With this file, filters can be applied to messages in the broadcast XML file. The receiver will display the message only if associated filters are compliant with the receiver configuration file.

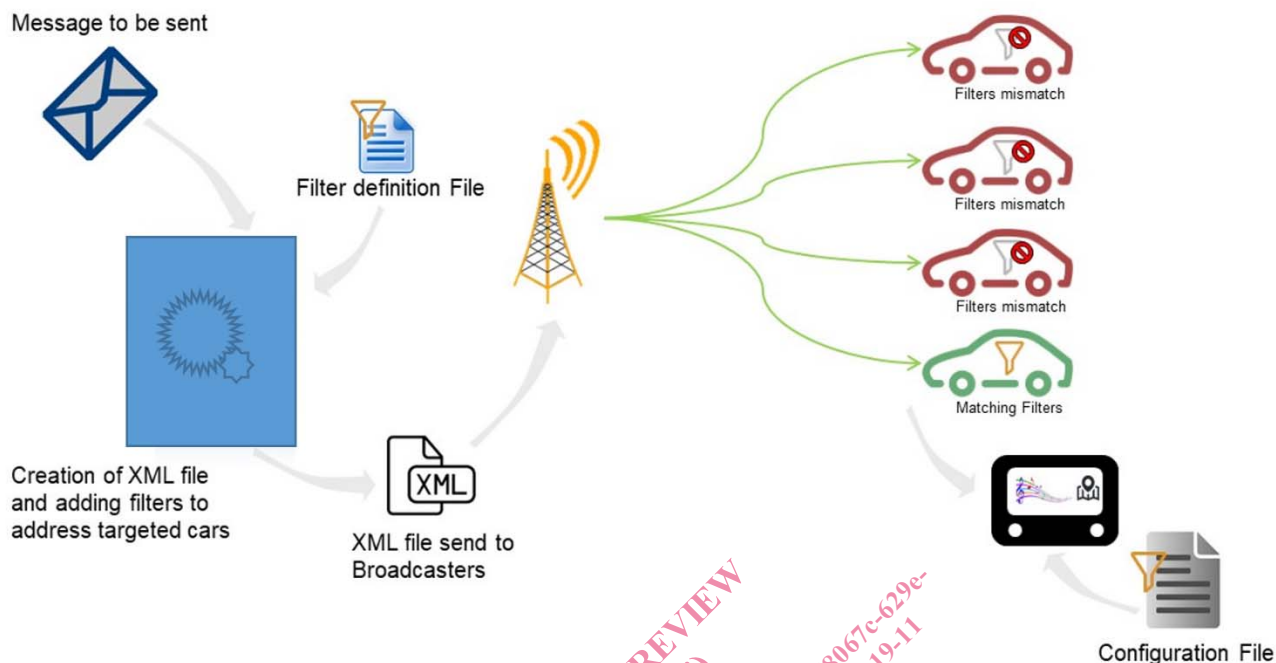


Figure 2: Example of use of the filter definition file

Messages from a particular service provider are grouped together into a FIS. The FIS may be encrypted to provide additional security, but the encryption method is not standardized. Encryption is not recommended when the FIS is directed to multiple receiver brands, for example, when a car rental company wants to send messages to the entire fleet; in this case different makes and models of cars with different receiver brands all need to be able to decode the FIS.

## 5 Filtered Information Service data

### 5.0 Introduction

A FIS consists of a set of messages, encoded as an XML file, and supporting data files, such as images, carried in an MOT carousel (see ETSI EN 301 234 [2]). The MOT carousel is transported using packet mode with additional FEC (see ETSI EN 300 401 [1]). Every file within the MOT carousel is identified with the company identifier to provide the first level of message selection in the receiver.

All XML documents defined in the present document shall use the ISO/IEC 10646 [5] character set using UTF-8 character encoding.

Text sections (attributes or elements) shall not use the following reserved XML characters:

& " '

These characters shall be encoded using the predefined entity references &amp; &quot; &apos; respectively.

The reserved XML characters < > may be used in the `title` and `body` elements. In all other text sections they shall be encoded using the predefined entity references &lt; &gt; respectively.

## 5.1 FIS element

This is the root element of the FIS document and can contain zero or more of the following elements:

- message.

Its attributes are detailed below:

Attribute	Description	Type	Status
key	Company identifier for entity providing the information.	<i>xs:unsignedInt</i>	Required
version	Indicator for changed content; shall be incremented by one for every new version of the <code>fis</code> element, modulo 65536.	<i>xs:unsignedShort</i>	Required

## 5.2 Message element

The message element can contain the following elements:

- text
- picture
- validity
- geolocation
- filters

As a minimum, one `text` element and one `validity` element shall be specified for each message. The `validity` element specifies the lifetime of the message in the receiver.

Its attributes are detailed below:

Attribute	Description	Type	Status
identifier	Unique identifier	<i>xs:unsignedInt</i>	Required
priority	Message priority chosen from: <b>critical, important, major, normal, minor, low</b>	<i>xs:enumeration</i>	Optional, defaults to "normal"

The `identifier` attribute shall be set to a unique value for each message, in the range 0 to 4 294 967 295.

A message is created by using a new `identifier`.

A message is deleted in the receiver only when its `validity` has expired, even if it is no longer transmitted. The service provider shall therefore ensure that no `identifier` is reused until after the message has expired.

Only the `validity` element may be updated, see clause 5.5: this allows a message to have its `validity` extended or curtailed. If any other content is changed, a new message with a different `identifier` shall be created; the old message should continue to be transmitted with an expired `validity` to ensure its deletion in receivers.

Not all messages will have the same importance: some may be really important, for example, if they concern a safety issue, others may be less important, for example, those that concern only promotion.

The FIS has 6 levels of messages:

- 0: critical
- 1: important
- 2: major

- 3: normal (default)
- 4: minor
- 5: low

Messages with priority 0, 1 or 2 shall be displayed by the receiver within their validity period (subject to other selection criteria).

Messages with priority 3, 4 or 5 do not have to be displayed. It is up to the receiver whether these messages are displayed within their validity period, and this could be implemented as a user settings option in the receiver.

The priority of a message shall not be changed.

## 5.3 Text element

### 5.3.1 General

The `text` element shall contain one of each of the following elements:

- language
- title
- body

Language variants of the same message can be provided by including text elements with different language settings. Variants of the body in the same language but with different levels of detail may be provided by defining message filters; care should be taken to ensure that only one text element in each language is provided for each filter output.

### 5.3.2 Formatting

Some W3C HTML tags can be used to provide formatting for the title and body.

Style, font and font size tags shall not be used. No font and default font size are defined for the text display due to screen resolution.

The text formatting tags defined in table 1 can be used in both the title and body elements.

**Table 1: W3C text formatting tags**

Tag	Description
<small>, <strong>	Relative size
<b>	Bold text
<em>	Emphasis text
<i>	Italic text
<sub>	Subscripted text
<sup>	Superscripted text
<ins>	Inserted text
<del>	Deleted text
<mark>	Highlighted text