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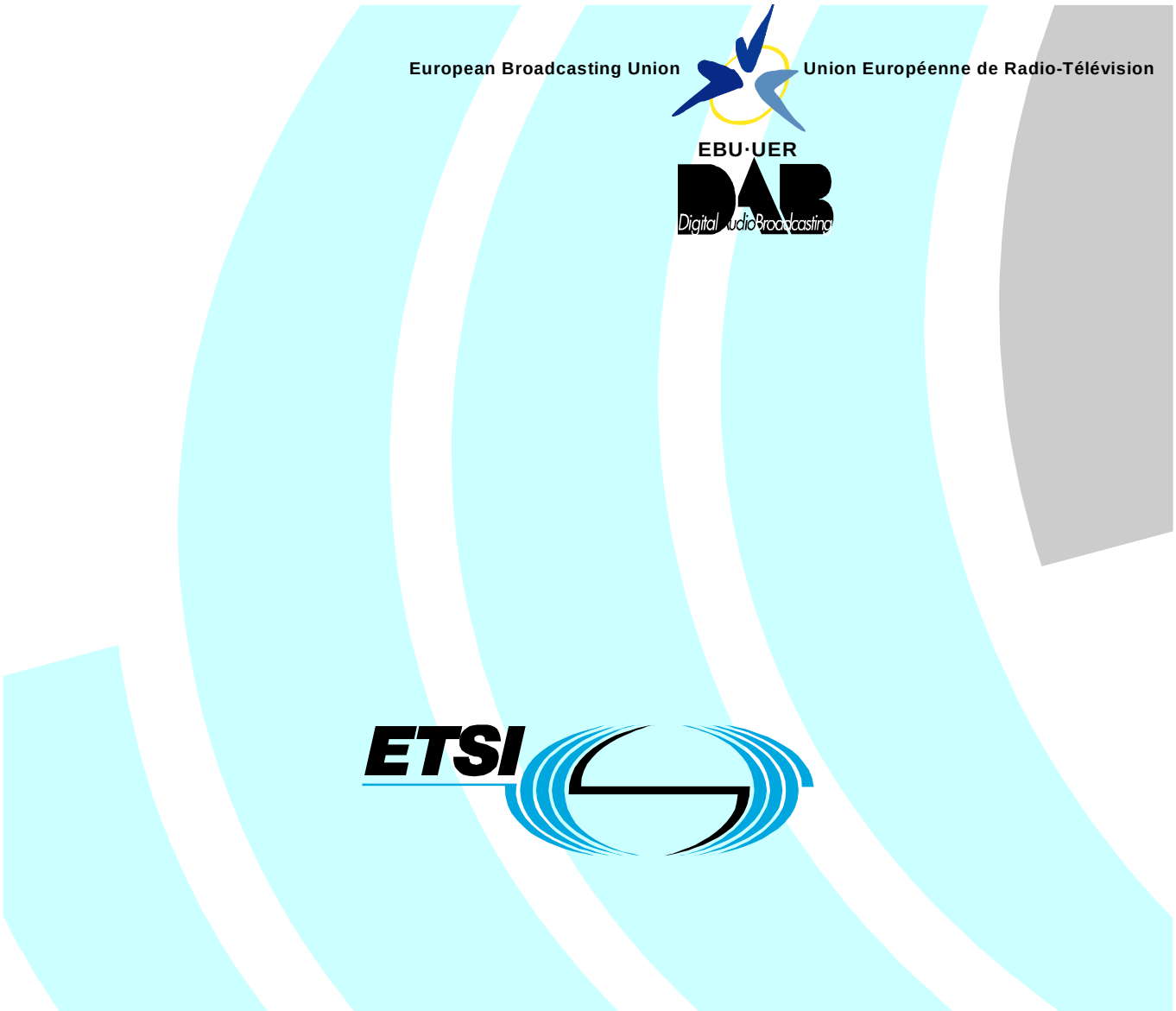
Technical Specification

Digital Audio Broadcasting (DAB); DAB-TMC (Traffic Message Channel)



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Foreword

This Technical Specification (TS) has been produced by the Joint Technical Committee (JTC) Broadcast of the European Broadcasting Union (EBU), Comité Européen de Normalization 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, EN 300 401 [1], for DAB (see note) which now has worldwide acceptance. The members of the Eureka Project 147 are drawn from broadcasting organizations and telecommunication providers together with companies from the professional and consumer electronics industry.

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

Introduction

The Traffic Message Channel (TMC) was originally designed for transport in the narrow-band Radio Data System (RDS) services in FM broadcast (see IEC 62106 [5]). TMC messages provide a valuable information service to motorists. DAB enables TMC messages to be carried in a much faster and bitrate-efficient way. A uniform nation-wide traffic report is possible thanks to the shorter cycle times of DAB-TMC as compared to RDS-TMC.

Compared to RDS-TMC, DAB-TMC features several advantages:

- DAB-TMC has a cycle time that is much shorter than RDS-TMC. This can be used to shorten the acquisition time at the DAB receiver or to increase the amount of transmitted messages.
- DAB-TMC is very robust against multipath thanks to its COFDM modulation scheme.
- DAB-TMC allows easy filtering of TMC messages according to selected regions.

- The DAB-TMC messages, carried in FIG 5/1, are assembled together with other FIGs in Fast Information Blocks (FIBs). Each FIB has a strong error protection of 2 bytes Cyclic Redundancy Check (CRC) per 32 bytes of data. Moreover the Fast Information Channel (FIC) features an extra error protection thanks to the convolutional code rate of 1/3. The FIC data are not time-interleaved so that the TMC data can be obtained fast. The net data rate in the FIC is 32 kbit/s.

1 Scope

The DAB-TMC specification defined in the present document provides DAB with the ability to transport TMC messages using the DAB Fast Information Data channel (FIDC). The TMC user and system messages which are encoded according to ISO 14819-1 [4] are carried in Extension 1of FIG type 5 (FIG 5/1).

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

[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".

[3] ETSI TR 101 496-2: "Digital Audio Broadcasting (DAB); Guidelines and rules for implementation and operation".

[4] ISO 14819-1: "Traffic and Traveller Information (TTI) - TTI messages via traffic message coding - Coding protocol for Radio Data System - Traffic message Channel (RDS-TMC).

[5] IEC 62106: "Specification of the radio data system (RDS) for VHF/FM sound broadcasting in the frequency range from 87,5 to 108,0 MHz.

[6] EN ISO 14819-6: "Traffic and Traveller Information (TTI) - TTI Messages via Traffic Message Coding - Part 6: Encryption and conditional access for the Radio Data System - Traffic Message Channel ALERT C coding".

3 Definitions and abbreviations

3.1 Definitions

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

Access Control System (ACS): particular set of rules for managing entitlement checking and conditional access messages

Conditional Access (CA): mechanism by which user access to service components can be restricted

DAB-TMC system message: 16 bit field comprising a part of TMC system information

DAB-TMC user message: 37 bit field comprising either a TMC User message, TMC tuning information, an Encryption Administration Group (EAG) or future TMC applications conveyed in ODA groups requiring 37 bits mapping

data service: service which comprises a non-audio primary service component and optionally additional secondary service components

Encryption Administration Group (EAG): RDS type 8A group which comprises details of the encryption parameters such as the Service IDentifier (SID), the ENCryption IDentifier (ENCID) and the Location Table Number Before Encryption (LTNBE)

Fast Information Block (FIB): data burst of 256 bits

NOTE: The sequence of FIBs is carried by the Fast Information Channel. The structure of the FIB is common to all transmission modes.

Fast Information Channel (FIC): part of the transmission frame, comprising the Fast Information Blocks, which contains the multiplex configuration information together with optional service Information and data service components

Fast Information Data Channel (FIDC): dedicated part of the Fast Information Channel which is available for non-audio related data services, such as paging

Fast Information Group (FIG): package of data used for one application in the Fast Information Channel

NOTE: Eight different types are available to provide a classification of the applications.

Location Table Number (LTN): number to identify the location table used by the service provider

multi-group messages: sequences of between two and five TMC single group messages that constitute a detailed TMC message

Personal Identification Number (PIN): numeric or alphanumeric code required to be entered into a terminal before that terminal is permitted to present decrypted TMC messages

primary service component: first and mandatory component of a service

NOTE: It can be used as a default selection in the receiver.

secondary service component: in case a service contains more than the primary service component, the additional service components are secondary service components

service: user-selectable output, which can be either a programme service or a data service

service component: part of a service which carries either audio or data

NOTE: Each service component is carried either in a sub-channel or in the Fast Information Data Channel (FID).

Service Identifier (SId): 16- or 32-bit code used to identify a particular DAB service

Service IDentifier (SID): 6-bit code uniquely identifying a TMC Service

service label: alphanumeric characters associated with a particular service and intended for display in a receiver

sub-channel: part of the Main Service Channel, which is individually convolutionally encoded and comprises an integral number of Capacity Units per Common Interleaved Frame

TMC system information: information that enables a TMC product to decode and evaluate essential data, which describes the transmission, being received e.g. AID, LTN, SID, MGS

TMC system message: message comprising either TMC system information or TMC tuning information

TMC tuning information: information that a TMC product needs to change from one transmitter to another if the signal becomes weak

TMC user message: message comprising parameters of the actual traffic message such as the Location code and the Event code

3.2 Abbreviations

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

AID	Application identification (TMC)
ALERT-C	Advice and problem Location for European Road Traffic-version C
CA	Conditional Access
CAId	Conditional Access Identifier
CRC	Cyclic Redundancy Check
DAB	Digital Audio Broadcasting
DSCTy	Data Service Component Type
EAG	Encryption Administration Group (TMC)
EBU	European Broadcasting Union
ECC	Extended Country Code
ENCID	ENCryption IDentifier
FI	Frequency Information
FIB	Fast Information Block
FIC	Fast Information Channel
FIDC	Fast Information Data Channel
FIDCId	Fast Information Data Channel Identifier
FIG	Fast Information Group
GPS	Global Positioning System
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
LTN	Location Table Number (TMC)
LTNBE	Location Table Number Before Encryption
LTO	Local Time Offset
MGS	Message Geographical Scope (TMC)
MJD	Modified Julian Date
MSC	Main Service Channel
ODA	Open Data Application (RDS)
PI	Programme Identification code (RDS)
PIN	Personal Identification Number
RDS	Radio Data System
SCIdS	Service Component Identifier within the Service
SFN	Single Frequency Network
SId	Service Identifier (DAB)
SID	Service IDentifier (TMC)
SPN	Service Provider Name (TMC)
TCId	Type Component Identifier
TII	Transmitter Identification Information
TMC	Traffic Message Channel
TMId	Transport Mechanism Identifier
UA	User Application
UTC	Co-ordinated Universal Time

4 DAB-TMC specification

The DAB-TMC specification defined in the present document provides DAB with the ability to transport TMC messages using the DAB Fast Information Data channel (FIDC). The TMC User and System messages which are encoded according to the protocol described in ISO 14819-1 [4], are carried in Extension 1of FIG type 5 (FIG 5/1).

4.1 DAB-TMC service component in the FIDC

In DAB each service may contain one or more service components. The essential service component of a service is called the primary service component. Normally this would carry the audio, but data service components can be primary as well. All other service components are optional and are called secondary service components.

An example of a service structure is shown in figure 1. The service identified by the service label "ALPHA 1 RADIO" comprises two service components: a primary audio component and a secondary data component. The secondary service component is used for a Traffic Message Channel (ALPHA-TMC). The audio component is carried in a sub-channel in the Main Service Channel (MSC), whereas the TMC is carried in the Fast Information Data Channel (FIDC) within the Fast Information Channel (FIC).

The service organization allows service components to be shared by different services. It also allows the service structure to be changed so that a service may change its service component. Service "ALPHA 2 RADIO" shares the ALPHA-TMC service component with "ALPHA 1 RADIO".

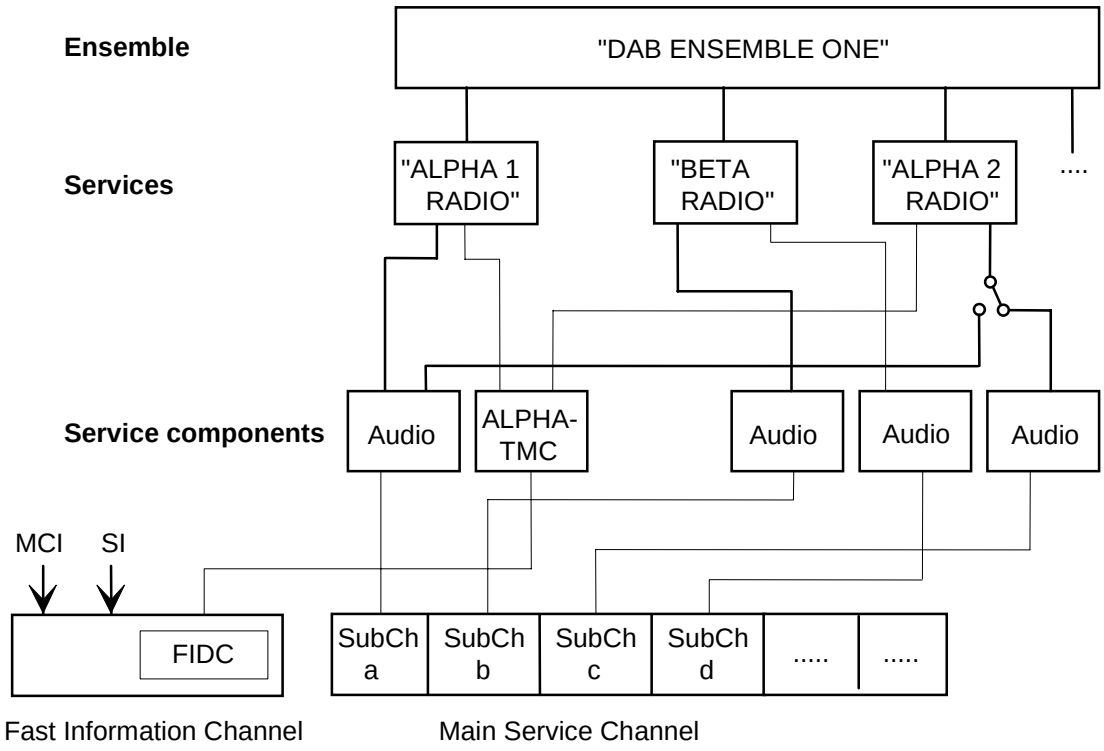

Figure 1: Example of the DAB service structure with TMC service component in the FIDC

5 Coding of DAB-TMC messages

TMC data is carried in DAB in the Fast Information Data Channel (FIDC).

Traffic messages are encoded in Extension 1 of FIG type 5 (FIG 5/1). Figure 2 shows the structure of the TMC message field which is part of the type 5 field (see also EN 300 401 [1]).

The Type Component Identifier (TCId) field of the FIG type 5 field is used to allow up to eight different TMC services to be carried in one multiplex.

The following definitions apply to the flags D1 and D2 (see EN 300 401 [1] clause 5.2.2.3):

- **D1:** this 1-bit flag shall signal whether the type 5 field contains TMC messages with a length of 37-bits or 16-bits as follows:
  - 0: 37-bit TMC messages;
  - 1: 16-bit TMC messages.
- **D2:** this 1-bit flag shall be set to 0 (even in the case of TMC encryption according to ISO 14819-6 [6]).

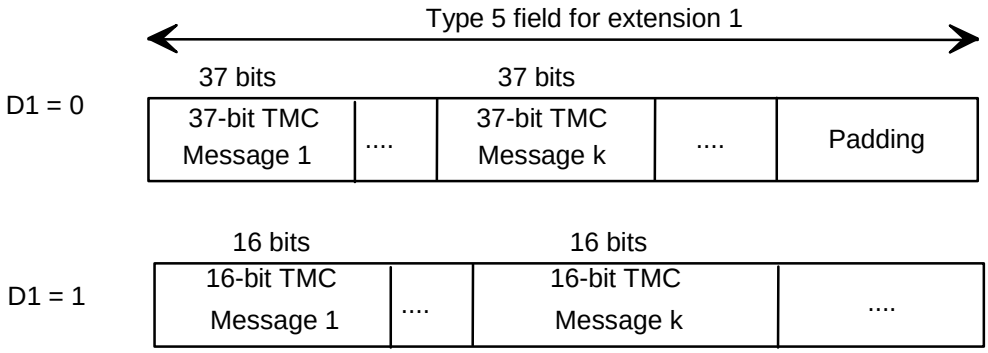

Figure 2: Structure of Traffic Message Channel field

The following definitions apply:

37-bit TMC Message: this 37-bit field shall contain one of the following:

- **TMC User message:** a message as defined in ISO 14819-1 [4], comprising parameters such as the Location code and Event code.
- **TMC tuning information:** information as defined in ISO 14819-1 [4], comprising information that a TMC product needs to change from one transmitter to another if the signal becomes weak.
- **Encryption Administration group:** information as defined in ISO 14819-6 [6] comprising details of the encryption parameters such as the Service Identifier (SID), the ENCryption Identifier (ENCID) and the Location Table Number Before Encryption (LTNBE).
- **Future information:** future TMC applications conveyed in RDS-ODA groups requiring 37 bits mapping (e.g. 11A, 13A, etc.).

The mapping of 37-bit TMC messages is described in clause 5.1 of the present document.

Padding: this field shall contain sufficient bits in the range 0 to 7 to make up the length to an integral number of bytes. The padding bits shall be set to "0".

16-bit TMC Message: this 16-bit field shall contain **TMC system information** as defined in ISO 14819-1 [4].

The mapping of 16-bit TMC messages is described in clause 5.2 of the present document.

Figure 3 shows in a conceptual block diagram how a TMC encoder transmits TMC messages comprising TMC user and system messages to a TMC decoder via the RDS and DAB channel. The TMC decoder located in the receiver extracts the TMC messages from the RDS and DAB channel. The upper DAB-TMC path is the subject of the present document. The lower part is described in ISO 14819-1 [4].

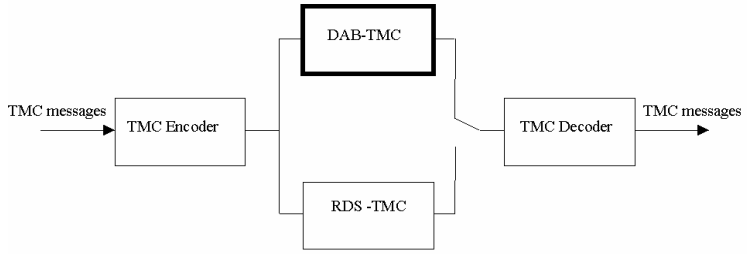

Figure 3: TMC messages transmitted via DAB-TMC and RDS-TMC to TMC decoder

5.1 Mapping of 37-bit TMC messages

Figure 4 shows how all 37-bit TMC messages are mapped to the data field of FIG 5/1 using the same method. Bits X4-X0 of Block 2 and the information words in Blocks 3 and 4 only are mapped into consecutive 37-bit TMC messages in the FIG 5/1 data field. Block 1, containing the RDS PI code is not mapped.

Parameter D1: Shall be set to "0" to indicate that FIG 5/1 is carrying 37-bit TMC messages.

Parameter D2: Shall be set to "0" (even in the case of TMC encryption according to ISO 14819-6 [6]).

TCId (Type Component Identifier): Shall identify the TMC service component.

37-bit TMC message: This 37-bit field shall contain a 37-bit TMC message.

NOTE 1: Since the size of a type 5 field for extension 1 can be maximum 28 bytes, up to six 37-bit TMC messages can be assembled in one FIG 5/1 data field. A multi-group TMC user message (a sequence of between two and five TMC user messages) should preferably be assembled into one FIG 5/1 data field. However, the cycle management shall be adopted from ISO 14819-1 [4].

NOTE 2: A padding field is provided to make up the length to an integral number of bytes.

NOTE 3: The immediate repetition of TMC messages (as described in ISO 14819-1 [4]) is not required in DAB.

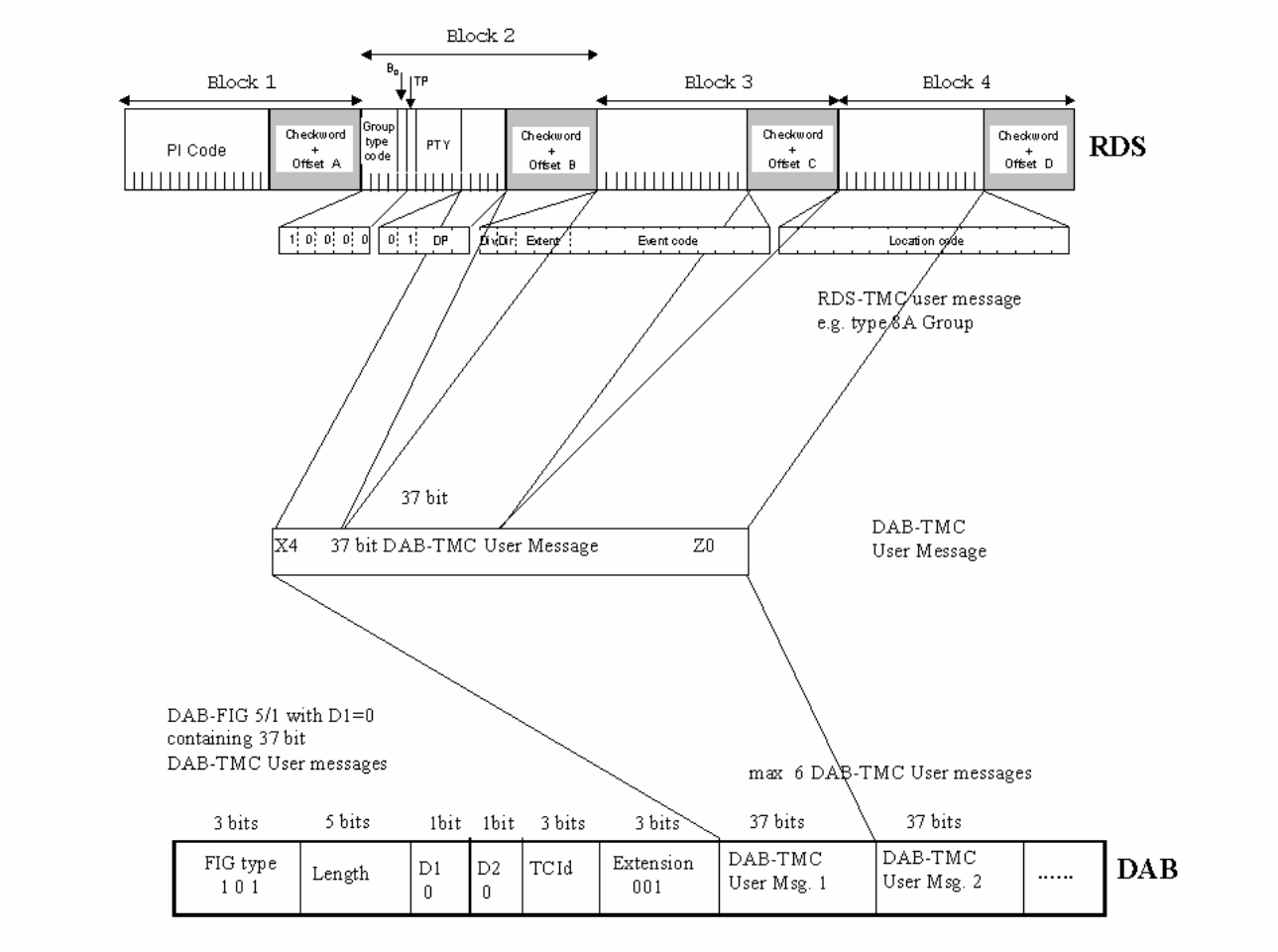

Figure 4: Mapping of 37-bit TMC messages in FIG 5/1 data field (example shown is TMC user message)

5.2 Mapping of 16-bit TMC messages

Figure 5 shows how 16-bit TMC messages are mapped to the data field of FIG 5/1. Only the information word in Block 3 containing the TMC message bits is mapped. Block 1 containing the PI code is not mapped. Block 4 containing the AID (Application Identification) is also not mapped since the AID is specified using FIG 0/13 (User Application Information, see clause 6.2).

Parameter D1: Shall be set to "1" to indicate that FIG 5/1 is carrying 16-bit TMC messages.

Parameter D2: Shall be set to "0" (even in the case of TMC encryption according to ISO 14819-6 [6]).

TCId (Type Component Identifier): Shall identify the TMC service component.

16-bit TMC message: This 16-bit field shall contain a 16-bit TMC message.

NOTE 1: Since the size of a type 5 field for extension 1 can be maximum 28 bytes, up to 14 16-bit TMC Messages can be assembled in one FIG 5/1 data field.

NOTE 2: The immediate repetition of TMC messages (as described in ISO 14819-1 [4]) is not required in DAB.

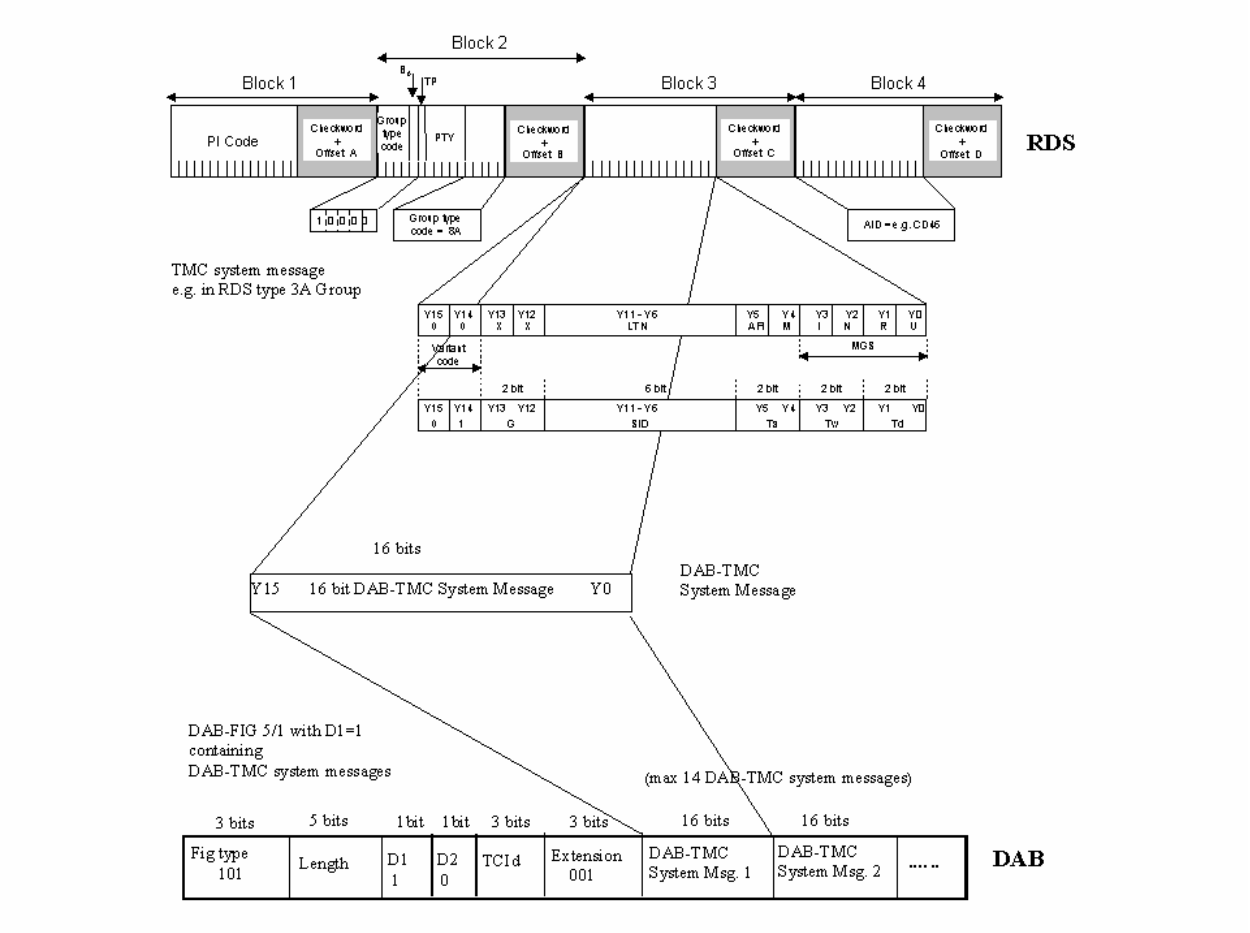

Figure 5: Mapping of 16-bit TMC messages in FIG 5/1 (example shown is TMC System Message)

6 DAB-TMC signalling

TMC is signalled in DAB by means of FIG 0/2 (Service Organization) and FIG 0/13 (User Application Information). Other FIGs are also required to operate a TMC service, see clause 6.3 of the present document.

6.1 Format of FIG 0/2 (Service Organization) for DAB-TMC

See EN 300 401 [1] for the format of FIG 0/2 and the definitions of the fields.

For DAB-TMC the values carried by specific fields are as follows:

SId (Service Identifier):

The SId identifies the DAB service carrying the TMC service. If the TMC service is stand alone, it is a data service and shall be allocated a 32-bit SId. If the TMC service is part of a programme (audio) or data service, the SId is that of the programme (audio) or data service and the TMC service is a secondary component of the programme (audio) or data service.

NOTE: If the TMC service is a component of a programme service, then the ECC shall be carried in FIG 0/9 (Country, LTO and International table).

Local flag:

For DAB-TMC this flag shall be set to "0" (whole ensemble service area).

CAId (Conditional Access Identifier):

For DAB-TMC this field shall be set to "000" regardless of whether the TMC service is encrypted or not (TMC encryption is carried out at the TMC not DAB layer).

Service component description:

TMId (Transport Mechanism Identifier):

- This field shall be set to indicate "FIDC" (see EN 300 401 [1]).

DSCTy (Data Service Component Type):

- This field shall be set to indicate "TMC" (see TS 101 756 [2]).

FIDCId (Fast Information Data Channel Identifier):

- The 3-bit extension field is set to 001 to denote "TMC".
- The 3-bit TCId field is used to differentiate among up to eight different TMC service components.

CA flag:

- If the TMC service is encrypted according to ISO 14819-6 [7] the CA flag is set to 1 else it is set to 0.

6.2 Format of FIG 0/13 (User Application information) for DAB-TMC

Since User Application (UA) signalling in DAB is independent of the transport protocol it is mandatory to signal the User Application type (UA type) by means of FIG 0/13.

See EN 300 401 [1] for the format of FIG 0/13 and the definitions of the fields.

For DAB-TMC the values carried by specific fields are as follows:

SId (Service Identifier):

- The SId identifies the DAB service carrying the TMC service. If the TMC service is stand alone, it is a data service and shall be allocated a 32-bit SId. If the TMC service is part of a programme (audio) service, the SId is that of the audio service and the TMC service is a secondary component of the programme service.

SCIdS (Service Component Identifier within the Service):

- This 4-bit field shall identify the service component within the service.

NOTE: The combination of the SId and the SCIdS provides a globally valid identifier for the service component. FIG 0/8 (Service component global definition) indicates where the TMC service component is located in the FIDC (Fast Information Data Channel).

Number of user applications:

- For DAB-TMC this field shall be set to "1".

User Application Type:

- For DAB-TMC this field shall be set to indicate "TMC" (see TS 101 756 [2]).

User Application data length:

- For DAB-TMC this field shall be used to determine the contents of the User Application data field (see table 1).

User Application data:

- The User Application data field is used to signal TMC specific information. The interpretation of these fields depends on the User Application (UA) data length, *m*, as follows:

Table 1: Format of User Application data field

User Application data length *m*	User Application data field
0	The User Application data field is absent. The TMC application indicated is AID = CD46hex (ALERT-C)
1	not allowed
2	The User Application data field contains a 2-byte AID field that shall signal the AID (Application Identifier) to identify the TMC application.
3	The User Application data field contains a 2-byte AID field followed by a 1-byte TMC Variant field that shall be as defined in 'TMC Forum: List of allocated Application Identifiers (AID) and TMC Variants'
4 to 23	The User Application data field contains a 2-byte AID field followed by a 1 byte TMC-Variant field and (m-3) 1-byte Application Specific information fields that shall be as defined in 'TMC Forum: List of allocated Application Identifiers (AID) and TMC Variants'

The following definitions apply:

Application Identifier (AID): This 16-bit field, when present, shall contain the TMC Application Identifier as defined in TMC Forum: List of allocated Application Identifiers (AID) and TMC Variants .

NOTE: When the User Application data length = 0 the AID field is absent.
In this case the AID = CD46hex i.e. ALERT-C.

TMC Variant: This 8-bit field, when present, shall signal the TMC Variant as defined in "TMC Forum: List of allocated Application Identifiers (AID) and TMC Variants".

Application specific information: These 8-bits fields, when present, signal TMC specific information as defined in 'TMC Forum: List of allocated Application Identifiers (AID) and TMC Variants".

6.3 Other mandatory operational requirements

Besides of the FIGs mentioned in the previous clauses, following DAB parameters are mandatory:

- **FIG 0/8: Service Component Global Definition**. This FIG provides the appropriate cross-referencing information to link the service component identifiers that are valid globally to those that are valid only within a DAB ensemble. FIG 0/8 indicates where the DAB-TMC service component is located in the FIDC (Fast Information Data Channel) of the DAB Ensemble. The short form (L/S = 0) shall be used. The MSC/FIC flag shall be set to "1" to indicate that the TMC component is carried in the FIC and that the subsequent 6-bits field contains the FIDCId (Fast Information Data Channel Identifier) which identifies the TMC service component carried in the FIDC (see also figure 3).

- **FIG 0/9: Country, LTO, and International Table**. This FIG is required because it defines the local time offset and the ECC (Extended Country Code). The Ensemble ECC (which makes the Ensemble Id unique worldwide) shall be as defined in TS 101 756 [2]. The Service ECC shall be coded in the same way as the Ensemble ECC.

- **FIG 0/10: Data and Time**. This FIG is required in order to signal a location-independent timing reference in UTC format. Together with the Local Time Offset, provided in FIG 0/9, an Ensemble/Service related time is specified. UTC allows time interval calculations to be made independent of time zones and summer-time discontinuities. The date is encoded in Modified Julian Date (MJD) format.

- **FIG 0/21: Frequency Information (FI).** This FIG is required to allow mobile receivers, leaving the coverage area of a DAB transmitter or single frequency network, to re-tune to an alternative frequency (service following). The alternative frequency may apply to an identical DAB Ensemble, an Other Ensemble (carrying the equivalent TMC service component) or the frequency of an equivalent RDS-TMC service. Service following relies not only on FI, but also on OE services (FIG 0/24), Service Linking (FIG 0/6) and Region definition (FIG 0/11). The network related information in the TMC Tuning Information shall be carried in the FIC using the Service Following scheme described in clause 3.6.23 in TR 101 496-2 [3].

- **FIG 0/24: Other Ensembles services (OE services**). This FIG provides a link between a DAB-TMC Service component and other Ensembles carrying the same TMC Service component. Together with the Frequency Information in FIG 0/21 it allows service following for the same DAB-TMC Service component on other ensembles.

- **FIG 1/4: Service Component Label**. To ensure consistency between the TMC service and the information signalled in the DAB FIC, the Service Component Label carried in FIG 1/4 shall be identical to the TMC Service Provider Name (SPN).

- The validity and order of the TMC messages should be adopted from ISO 14819-1 [4]. Multi-group TMC messages can be assembled into one FIG 5/1. However, the cycle management shall be adopted from ISO 14819-1 [4].

Annex A (informative): Recommendations

DAB-TMC should preferably be signalled as a stand-alone data service with 32 bits SId (see clause 6.1 of the present document).

If a service has a secondary DAB-TMC service component on one ensemble it is recommended to provide this TMC component on all ensembles the service is being broadcast in (see clause 3.3.1 of TR 101 496-2 [3]).

The direct repetition of TMC messages (used in RDS for error detection) is not needed in DAB. For efficient use of bandwidth and to shorten the cycle time it is recommended to transmit TMC messages in DAB without repetition.

When the date and time information is processed the receiver will normally provide an accurate free-running clock and synchronize this to the time information. Conversion between MJD, UTC and various calendar formats can be accomplished in the receiver. Conversion to the correct local time can be performed in the receiver using the UTC and Local Time Offset (LTO) information.

Vehicles equipped with a navigation system can directly use the TMC information to dynamically recalculate the route according to the actual traffic situation in order to avoid traffic jams.

- **FIG 0/11: Region Definition** (see clause 3.6.15 of TR 101 496-2 [3]). This FIG can enhance a DAB-TMC service as it allows defining geographical regions. In the receiver the Region Identification (and the TII database) can be used for filtering TMC messages. It is recommended to provide in FIG 0/11 geographical co-ordinates (GATy = 0001) to enable a receiver to map the regions provided in TMC onto DAB regions which can then be used for filtering. The geographical area is defined as a spherical rectangle based on co-ordinates. The spherical rectangle allows GPS-based navigation systems to be used for automatic receiver location. The use of regional signalling in an SFN can help to reduce the list of frequencies, which are relevant for the receiver in any one location, provided that the regions are chosen carefully. The Region definition can also restrict the amount of FI for RDS frequencies, which a receiver needs to process. User-selectable region filters based on the Region Definition can be provided in receivers.

- **FIG 0/22: TII database** (see clause 3.6.21 of TR 101 496-2 [3]) DAB - TMC can be more effectively implemented if the position of the receiving vehicle and its driving direction were known from the Transmitter Identification Information (TII). This would allow DAB-TMC decoders to automatically filter TMC messages or to select messages, which are relevant within the locality. The TII provides the cross-reference between the transmitter identifiers and the geographic locations of transmitters (expressed in grid co-ordinates). The location of a transmitter is described in terms of its geographical latitude and longitude, in the same way as the output format of GPS. By comparing the TII codes receivable at a given location with the region definitions, a receiver may identify the region it is in. Also by measuring the relative time of arrival of the various signal contributions from different transmitters a receiver could calculate its approximate geographical position- this, of course, could be significantly improved if the radio is linked to a GPS receiver.

In the case of encrypted TMC messages according to ISO 14819-6 [7] the DAB-TMC receiver requires two "keys". The first "key" is given in confidence by the service provider to DAB-TMC terminal manufacturers with whom they have a commercial relationship. The second "key" is broadcast in the "Encryption Administration Group" in a RDS type 8A Group. Before an individual DAB-TMC terminal may present decrypted message to the end-user, it must have been activated to do so. Activation requires that a "PIN" code be entered. The PIN code controls access rights to each service and subscription period, allowing both "lifetime" and "term" business modes to co-exist.

Annex B (informative): Bibliography

TMC Forum: "List of allocated Application Identifiers (AID) and TMC Variants".

History

Document history		
V1.1.1	January 2005	Publication