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Intelligent transport systems — Traffic and travel information messages via traffic message coding —

Part 3: Location referencing for Radio Data System — Traffic Message Channel (RDS-TMC) using ALERT-C

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Systèmes intelligents de transport — Informations sur le trafic et le tourisme via le codage de messages sur le trafic —

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Partie 3: Références de localisants pour le système de radiodiffusion de données (RDS) Canal de messages d'informations sur le trafic (RDS-TMC) avec ALERT-C

Reference number
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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. www.iso.org/directives

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received. www.iso.org/patents

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

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The committee responsible for this document is ISO/TC 204, *Intelligent transport systems*.

This second edition cancels and replaces the first edition (ISO 14819-3:2004), which has been technically revised.

ISO 14819 consists of the following parts, under the general title *Intelligent transport systems — Traffic and travel information messages via traffic message coding*:

— *Part 1: Coding protocol for Radio Data System — Traffic Message Channel (RDS-TMC) using ALERT-C*

— *Part 2: Event and information codes for Radio Data System — Traffic Message Channel (RDS-TMC) using ALERT-C*

— *Part 3: Location referencing for Radio Data System — Traffic message Channel (RDS-TMC) using ALERT-C*

— *Part 6: Encryption and conditional access for the Radio Data System — Traffic Message Channel ALERT C coding*

Compared to previous releases, this version includes the following additions:

— Precise location referencing

— Tendencies of Traffic Queue Lengths (TTQL)

— Coding of parking POIs

— Coding of interrupted roads

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— Coding of other isolated POIs (except parking POIs)

— Coding of parallel roads

— Version identification of TMC location tables

— Location Table Exchange Format

— North American Safety Events in TMC

— Explicit Location Table Country Code transmission in TMC

— Guidelines for Service Providers and Terminal Manufacturers for Implementation of explicit Location Table Country Code transmission

— Coding of link roads

— GB-English - List of Quantifiers

— Additional Event Codes identified by Germany

— Additional TMC Events from Danish proposal

— Additional TMC Supplementary Information: Unconfirmed Report

— RDS-TMC delivery of IVR Telephone Number

— Coding of link roads

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Introduction

This part of ISO 14819 sets out ways of specifying places and positions in traffic and travel information messages, including RDS-TMC messages (the Radio Data System - Traffic Message Channel).

It defines the structure and semantics of location tables for Traffic Information Centres (TICs) and receivers.

a) Traffic and travel messages;

   1) Traffic and travel information is created and updated in an originating database, by human operators or automated systems. Information is transferred to one or more remote systems by means of messages.

   2) In this context, a message is a collection of data which is exchanged to convey information for an agreed purpose between two or more parties. Traffic and travel messages are digitally coded sets of data exchanged by interested parties, which convey information about traffic, travel and/or transport networks. Digital coding can be alphanumeric, as in EDIFACT, or binary, as in RDS-TMC.

   3) The traffic and travel messages developed in programmes of the European Union are open, non-proprietary proposals for standards intended to serve the public interest by facilitating interconnection and interoperability of the relevant information systems.

b) Location referencing.

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The location referencing component of a traffic and travel message enables a service provider to indicate the physical location of the event being described. The management of TMC location databases requires on-going maintenance. It is necessary to both manage location database ID allocation for countries implementing TMC services and to validate new and updated location databases when ground features change. These activities are led by service providers who also need to ensure that their end-users are kept up-to-date. The Traveller Information Services Association (www.tisa.org) manages the ID allocation on a worldwide basis. TISA provides location database validation for service providers who generally arrange location database updates on a bi-annual cycle.

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Intelligent transport systems — Traffic and travel information messages via traffic message coding —

Part 3: Location referencing for Radio Data System — Traffic Message Channel (RDS-TMC) using ALERT-C

1 Scope

This part of ISO 14819 sets out ways of specifying places and positions in traffic and travel information messages, including RDS-TMC messages (the Radio Data System - Traffic Message Channel). It primarily addresses the needs of RDS-TMC ALERT-C messages which are already being implemented. However, the modular approach used here is intended to facilitate future extension of the location referencing rules to other traffic and travel messaging systems.

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The location referencing rules defined in this part of ISO 14819 address the specific requirements of Traffic Message Channel (TMC) systems, which use abbreviated coding formats to provide TTI messages. In particular, the rules address the Radio Data System - Traffic Message Channel (RDS-TMC), a means of providing digitally-coded traffic and travel information to travellers using a silent data channel (RDS) on FM radio stations, based on the ALERT-C protocol.

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2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 8859-15:1999, *Information technology — 8-bit single-byte coded graphic character sets — Part 15: Latin alphabet No. 9*

ISO/IEC 10646:2012, *Information technology — Universal Coded Character Set (UCS)*

ISO 14819-1:2013, *Intelligent transport systems — Traffic and travel information messages via traffic message coding — Part 1: Coding protocol for Radio Data System — Traffic Message Channel (RDS-TMC) using ALERT-C*

ISO 14825:2011, *Intelligent transport systems — Geographic Data Files (GDF) — GDF5.0*

IEC 62106:2009, *Specification of the radio data system (RDS) for VHF/FM sound broadcasting in the frequency range from 87,5 to 108,0 MHz*

NIMA Technical Report TR8350.2, US Department of Defense

3 Abbreviated terms

For the purposes of this document, the following abbreviated terms apply:

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ALERT-C	Advice and problem Location for European Road Traffic, Version C
ASCII	American Standard Code for Information Interchange
CCD	Country code
CID	Country Identifier
CLST	Code of Location Subtype
CNAME	Country name
ECC	**E**xtended **C**ountry **C**ode (an RDS feature)
EDIFACT	**E**lectronic **D**ata **I**nterchange **F**or **A**dministration **C**ommerce and **T**ransport
GDF	**G**eographic **D**ata **F**iles (ISO 14825 for modelling and exchange of geographic data for transport telematics applications.)
LC	Location Code
LTCC	Location Table Country Code
LTN	Location Table Number
NIMA	National Imagery and Mapping Agency (US)
POI	Point of Interest
RDS	**R**adio **D**ata **S**ystem (digital information channel on FM sub carrier)
TIC	**T**raffic **I**nformation **C**entre
TISA	Traveller Information Services Association
TMC	**T**raffic **M**essage **C**hannel
TTI	**T**raffic and **T**ravel **I**nformation
WGS 84	**W**orld **G**eodetic **S**ystem 19**84**

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4 Location coding

4.1 General

Location references used by RDS-TMC are covered by the location referencing rules defined in this section. The ALERT-C coding protocol for RDS-TMC is defined in The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 8859-15:1999, *Information technology — 8-bit single-byte coded graphic character sets — Part 15: Latin alphabet No. 9*

ISO/IEC 10646:2012, *Information technology — Universal Coded Character Set (UCS)*

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ALERT-C supports a digital, silent data broadcast service for motorists, providing information about many kinds of traffic situations. This includes roadwork, weather and traffic incident information relating to major national and international roads, regional roads and local or urban roads.

4.2 Location tables

4.2.1 General

Within RDS-TMC, locations are identified and referenced by their location code. A given RDS-TMC service uses a pre-defined location table, containing the pre-stored details of the locations that can be referenced in messages from that service.

A location code in such a message refers and serves as a tabular 'address' of the pre-stored location details in the location table used by the service. A real world location may have more than one location code within the same location table. However, within a given location table, each location code refers to one and only one location. A location code has a number in the range 1 to 63,487.

NOTE In ALERT-C, a further 2048 numbers are reserved for INTER-ROAD (see The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 8859-15:1999, *Information technology — 8-bit single-byte coded graphic character sets — Part 15: Latin alphabet No. 9*

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ISO/IEC 10646:2012, Information technology — Universal Coded Character Set (UCS)

ISO 14819-1) and other forms of referencing.

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A table may contain a maximum number of 65,536 codes allocated in the following way:

Location code	Use
0	reserved
1 - 63,487	free for normal location coding
63,488 - 64,511	for special purposes
64,512 - 65,532	for INTER-ROAD
64,533 - 65,535	special functions

NOTE INTER-ROAD is a coding mechanism within ALERT-C to reference in a specific type of ALERT-C message (the INTER-ROAD message) a location belonging to a different location table. This can be a table in the same country as well as a table in another country.

4.2.2 Versions and versioning of location tables

Once a location has been allocated, it cannot easily be re-allocated (in an RDS-TMC/ALERT-C environment). Therefore, all existing locations and their associated location codes in a given location table should be regarded as fixed. However, other attributes of a location may, within certain constraints, sometimes change (e.g. name, positive offset, negative offset).

Within each location table, space (unallocated location codes) shall be left to accommodate future requirements for additional locations (to deal with new construction, and location referencing requirements not originally foreseen).

Whenever new locations are added to, or removed from, a location table (for example to extend coverage or to reflect changes to the road network), the resulting table shall be treated as a new version. The creation and tracking of versions of a location table allows the evolution of a location table to be understood and supports

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the successful use of the table and associated TMC service. A new version of an existing location table must remain compatible with the previous versions of the same location table – the changes must not be such that the location of a TMC message could be wrongly interpreted by a receiver. For example, location codes which are deleted should not be used for a long period. Also changing the attributes class and type of a location might cause an incompatible version of the table. It is part of TISA's location certification process to judge if a table is backwards compatible.

The method for identifying and labelling different versions of a location table is shown in Annex C.3.1

TISA has established an allocation of location tables to show which are in use or available for use in each country. The responsible agency in a country can apply for additional location table numbers in future, to support further applications or more detailed, regional location tables. New tables can also be issued occasionally to allow for complete updates to existing tables. Such major changes will however be very disruptive for users, as existing receivers will not recognise TMC messages relating to the new location table unless the same location table is also installed in the receiver. Switches from one location table to a different one (rather than a new version of the same table) should therefore be avoided as far as possible, especially in established markets.

4.2.3 Exchanging location tables

For TMC services to work well, the different organisations involved need to be able to understand the location table number, version and contents. To achieve this, a Location Table Exchange Format has been defined.

This format will be used for the exchange of TMC Location Tables between the various functional areas, e.g. receiver manufactures, map providers, certification of TMC location tables, Traffic Information Centres and service providers.

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The Location Table Exchange Format specifies the information that must be provided as part of a location table, and the way in which it is to be presented. The Location Table Exchange Format aims to provide a complete and precise description of a TMC Location table, that is readable from software programs without any changes or adaptations.

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A location table defined using the Location Table Exchange Format consists of a series of text files, each containing a set of records made up of predefined fields. The method for using the Location Table Exchange Format is defined in Annex C.3.2.

4.2.4 Hierarchical structure

RDS-TMC location tables use a hierarchical structure of pre-defined locations. A system of pointers provides *upward references* to higher-level locations of which the specified location forms a part.

Example Kent would have an upward **area reference** to south-east England. South-east England may be referenced up to the UK, then the British Isles, then Europe, etc. (Figure 1).

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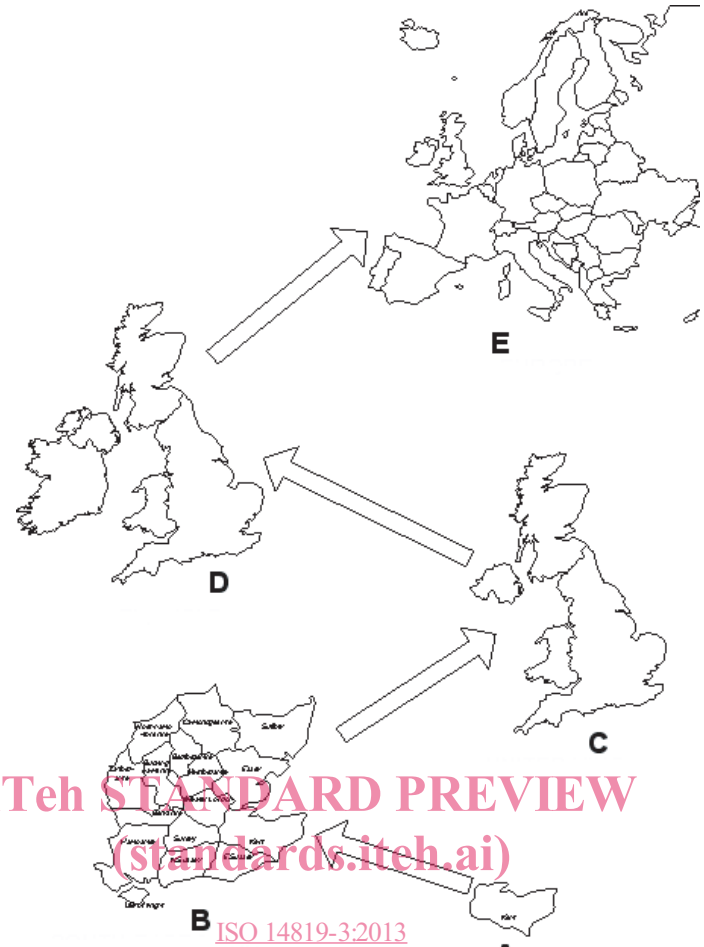

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Key

A County of Kent
B South East England
C United Kingdom
D British Isles
E Europe

Figure 1 — Upward Area Referencing

Junction 25 on the M1 motorway in UK would have a **linear reference** to a motorway segment, e.g. Leicester - Sheffield. This segment could then be referenced up to the whole road (the M1 Motorway).

Hierarchical tables help to make location referencing simple and unambiguous. A major benefit of hierarchical tables is that they facilitate automated sorting and selection of information for users. However, both hierarchical and unstructured tables are currently used in various applications.

4.2.5 Offsets

Most point locations and certain linear locations point to previous and next locations of the same type. This is indicated by negative and positive offsets.

Example Junction 25 on a motorway may be **offset** to Junction 26 in the positive direction, and to Junction 24 in the negative direction. A sign convention adopted at the time of coding locations specifies the **positive direction** of travel along each road (Figure 2).

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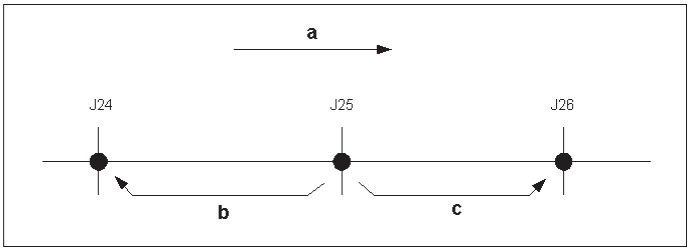

Key

a positive direction
b negative offset
c positive offset

Figure 2 — Offsets

4.2.6 Location types

Location types and subtypes are required for language independence of the information given, and to tell the receiving system what data fields to expect.

At the highest level, locations fall into three categories:

a) area locations

b) linear locations

c) point locations

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Within each category, location types are distinguished (in principle) whenever a location is functionally distinct in the way it shall be handled by the message recipient. Therefore a set of predefined location types and subtypes is set out in Annex A.

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Subtypes can be used to give further details of (for example) facilities available at a particular location, such as a service area. The current list, in Annex A, will be added to as further needs are agreed.

Official translations of the language-independent terms that describe location types and subtypes should be agreed on a national level.

4.2.7 Direction of the road

The predefined direction of the road (see 4.2.3) is reflected in the positive and negative offsets in the location table and in the order of the names of the end points of a road or road segment (see Table 1).

When newly specifying positive directions along roads within pre-defined tables, it is recommended to use geographic positive directions relative to the co-ordinate system, i.e. on the Northern Hemisphere from south to north and from west to east.

For ring roads the clockwise travel direction is recommended positive.

In any case it is not allowed to reverse the direction along continuous and / or connecting segments of a road, e.g. at administrative borders.

4.2.8 Country codes and location table numbers

With ALERT-C, it is assumed that RDS-TMC service and location tables are organised and defined on a country-by-country basis. Therefore each service and each location table is associated to a country code in the range 1-15 (hexadecimal 1-F) as described in IEC 62106. A service and the location table it uses shall

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have the same country code. There can be more than 1 location table per country. They are distinguished by an additional location table number in the range 1-63. Country codes are not unique. The extended country code (ECC, see IEC 62106) is therefore available in addition. The combination of extended country code (8 bits), country code (4 bits), location table number (6 bits) and location code (16 bits) defines an extended location code, which is unique worldwide.

TISA has established an allocation of location table numbers for each country, given in Annex B. As far as possible, the allocated combinations of country code and location table number define a location table uniquely, regardless of extended country code. This ensures support for countries where, for historical reasons, the extended country code is not in use. As can be concluded from Annex B, a country like e.g. Austria can have at most 8 location tables.

4.2.9 Constraints

Constraints on location coding may in future be agreed, modelled and documented. At present, however, national authorities and/or service providers are free to allocate location codes within a location table as they wish, to locations specified in accordance with these rules.

4.3 TMC Location categories, types and subtypes

Location categories, types and location subtypes are standardised, and specified in Annex A. Each location is described by a code, which is composed of:

— a character (A, L or P), indicating the location category (area, linear or point),

— a number indicating the type,

— a dot,

— a number indicating a subtype.

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EXAMPLE 1 *P1.8 - roundabout* (P = point, P1 = junction)

For types for which not a subtype is defined, the subtype code 0 (zero) has to be used to define the type as a subtype.

EXAMPLE 2 A3.0 – country

4.4 Location table content

4.4.1 General

The location table content is fixed only for the purposes of definition and exchange. The information used within specific applications or by individual manufacturers is not fixed, and is not within the scope of these specifications.

For international consistency, one single location table content shall be adhered to for definition and exchange purposes. In this structure, some items are mandatory; some items are mandatory where they exist; and some items are optional.

4.4.2 Nominal record content

The nominal content of each record in the location table is as follows:

— location code,

— code of location (sub) type,

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