TECHNICAL SPECIFICATION

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Traffic and Traveller Information (TTI) — TTI messages via traffic message coding —

Part 3: Location referencing for ALERT-C

Information trafic et voyageurs (TTI) — Messages TTI via le codage de messages du trafic —

Partie 3: Référence d'emplacement pour ALERT-C

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of normative document:

— an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;

— an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed every three years with a view to deciding whether it can be transformed into an International Standard.

Attention is drawn to the possibility that some of the elements of this Technical Specification may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TS 14819-3 was prepared by the European Committee for Standardization (CEN) in collaboration with Technical Committee ISO/TC 204, *Transport information and control systems*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Throughout the text of this document, read "...this European Prestandard..." to mean "...this Technical Specification...".

ISO 14819 consists of the following parts, under the general title *Traffic and Traveller Information (TTI) — TTI 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)*

— *Part 3: Location referencing for ALERT-C*

Annexes A, B and ZA form a normative part of this part of ISO 14819. Annex C is for information only.

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FOREWORD

The text of ENV ISO 14819-3:2000 has been prepared by Technical Committee CEN/TC 278 "Road transport and traffic telematics", the secretariat of which is held by NEN, in collaboration with Technical Committee ISO/TC 204 "Transport information and control systems".

This pre-Standard was prepared by Working Group 7 of CEN TC278. In the field of Traffic and travel Information, the innovative rate is high, with many research and development projects under way in many countries, and there is a need to establish prospective standards which allow manufacturers to introduce competitive products to the market in the knowledge that they can accommodate the future issues of the standard(s) without fundamental change to equipment.

No known national standards (identical or conflicting) exist on this subject.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this European Prestandard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

INTRODUCTION

This document 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.

1. TRAFFIC AND TRAVEL MESSAGES

   a) 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.

   b) 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.

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

2. LOCATION REFERENCING

   a) Location references provide the means of saying *where* in traffic and travel messages.

1 SCOPE

This European Prestandard primarily addresses the needs of RDS-TMC ALERT-C messages, which are ready for near-term implementation. However, the modular approach used here is intended to facilitate future extension of the location referencing rules to other traffic and travel messaging systems.

The location referencing rules defined in this European Prestandard address the specific requirements of Traffic Message Channel (TMC) systems, which use abbreviated coding formats to provide TTI messages over mobile bearers (e.g. GSM, DAB) or via exchange protocols like DATEX. 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.

2 NORMATIVE REFERENCES

This European Prestandard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Prestandard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 50067	Specification of the Radio Data System (RDS) for VHF/FM sound broadcasting in the frequency range from 87,5 to 108,0 MHz.
prEN ISO 14819-1:1999	Traffic and travel Information (TTI) - TTI Messages via traffic message coding - Part 1: Coding protocol for Radio Data System - Traffic Message Channel (RDS-TMC) using ALERT-C (ISO/DIS 14819-1:1999)
ENV ISO 14825	Geographic Data Files

3 ABBREVIATIONS

For the purpose of this European Prestandard, the following abbreviations apply:

ALERT	**A**dvice and problem **L**ocation for **E**uropean **R**oad **T**raffic (name of a European project in the first half of the 1990's to develop TTI messaging)
(A)TT	(**A**dvanced) **T**ransport **T**elematics
CENELEC	**C**omité **E**uropéen de **N**ormalisation **ELEC**trotechnique
DAB	**D**igital **A**udio **B**roadcasting (future wide-band digital successor of FM)
DATEX	**DAT**a **Ex**change network (agreement between traffic information centres for exchange of traffic and travel information, and protocol for such exchange)
EDIFACT	**E**lectronic **D**ata **I**nterchange **F**or **A**dministration **C**ommerce and **T**ransport
GDF	**G**eographic **D**ata **F**iles (European Prestandard ENV ISO 14825 for modelling and exchange of geographic data for transport telematics applications. Currently under review by CEN and ISO.)
RDS	**R**adio **D**ata **S**ystem (digital information channel on FM sub carrier)
TIC	**T**raffic **I**nformation **C**entre
TMC	**T**raffic **M**essage **C**hannel
TTI	**T**raffic and **T**ravel **I**nformation
WGS 84	**W**orld **G**eodetic **S**ystem 1984

4 LOCATION CODING

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 prEN ISO 14819-1:1999.

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.

4.1 LOCATION TABLES

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 EUROAD (see prEN ISO 14819-1:1999) and other forms of referencing.

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 EUROAD
64,533 - 65,535	special functions

Note EUROAD is a coding mechanism within ALERT-C to reference in a specific type of ALERT-C message (the EUROAD message) a location belonging to a different location table.

4.1.1 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 4.1).

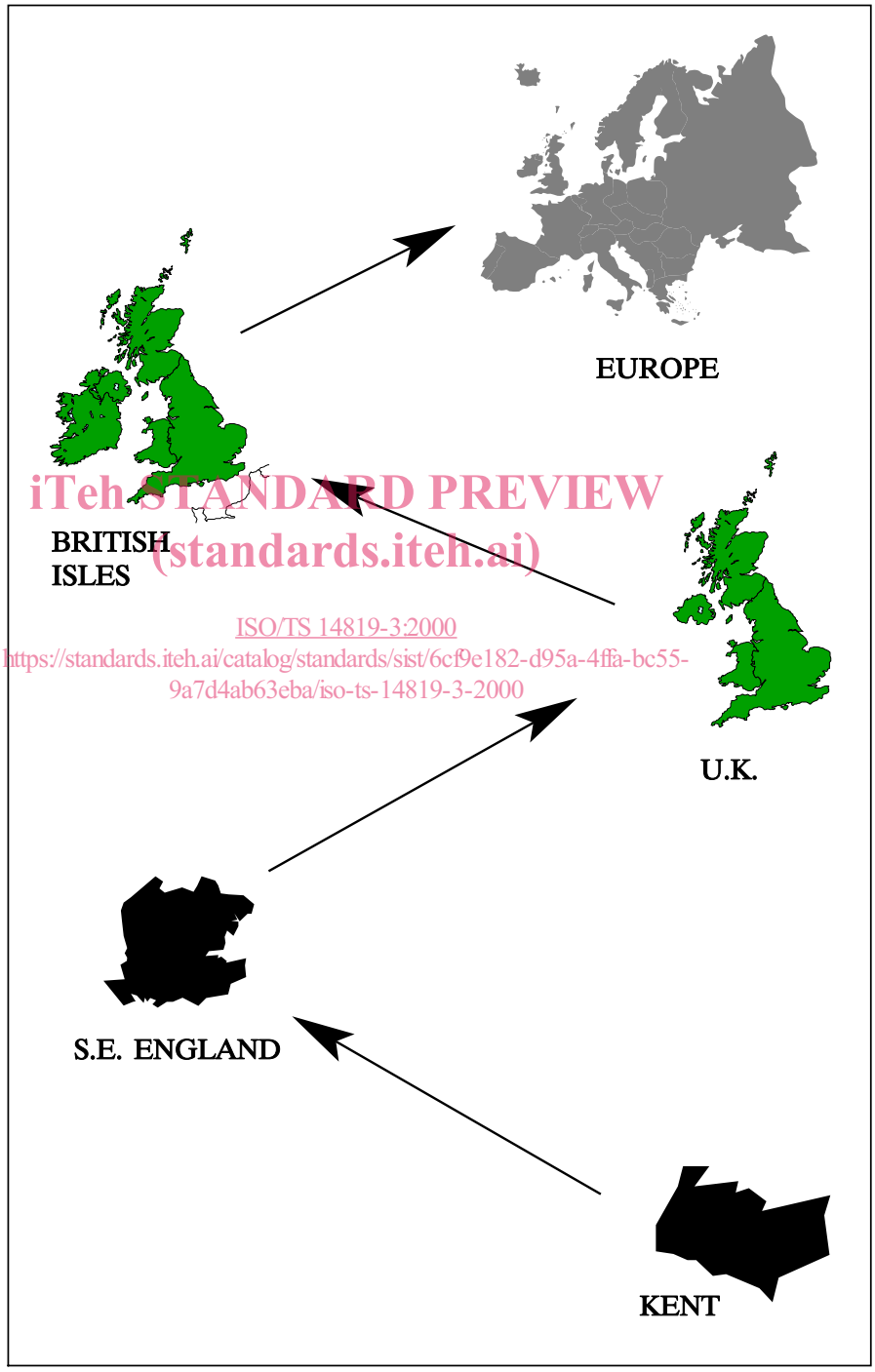

Figure 4.1 - Upward Area Referencing

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 ATT applications.

4.1.2 Offsets

Certain linear locations, and point locations, may 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 4.2).

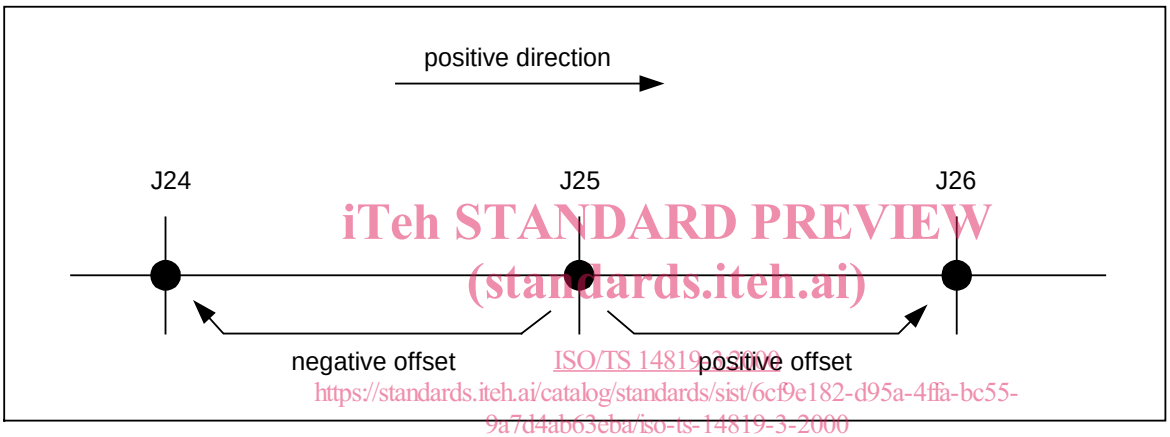

Figure 4.2. - Offsets

4.1.3 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:

1. area locations
2. linear locations
3. point locations

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

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.

4.1.4 Direction of the road

The predefined direction of the road (see section 4.1.2) 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 in 4.3.3).

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.

4.1.5 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 EN50067. A service and the location table it uses must 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.

Each country code is shared by more than one country within Europe and the surrounding territories. To avoid ambiguity in European RDS-TMC location referencing, ranges of location table numbers are allocated to specific countries, in accordance with the table given in Annex B.

In this way, each location table is uniquely identified by its country code and location table number. As can be concluded from Annex B, a country like e.g. Austria can have at most 8 location tables.

4.1.6 Unique location code

The combination of country code (4 bits), location table number (6 bits) and location code (16 bits) defines an extended location code, which is unique throughout Europe.

4.1.7 Constraints

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

4.1.8 Future developments

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

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 should be regarded as fixed. However, other attributes of a location may, within certain constraints, sometimes change (Example: name, positive offset, negative offset).

Many location table numbers are not yet allocated. 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, and should be avoided as far as possible or at least not be done too frequently.