



BSI Standards Publication

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

National foreword

This British Standard is the UK implementation of EN ISO 14819-3:2021. It is identical to ISO 14819-3:2021. It supersedes BS EN ISO 14819-3:2013, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee EPL/278, Intelligent transport systems.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Published by BSI Standards Limited 2021

ISBN 978 0 539 02487 6

ICS 03.220.20; 35.240.60

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 March 2021.

Amendments/corrigenda issued since publication

Date	Text affected
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English Version

**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 (ISO 14819-
3:2021)**

Systèmes de transport intelligents - Informations sur le trafic et les déplacements via le codage de messages sur le trafic - Partie 3 : Références de localisants pour le système de radiodiffusion de données - canal de messages d'informations sur le trafic (RDS-TMC) avec Alert-C (ISO 14819-3:2021)

Intelligente Verkehrssysteme - Verkehrs- und Reiseinformationen über Verkehrsmeldungskodierung - Teil 3: Ortsreferenzierung für Radiodatensysteme - Verkehrsmeldungskanal (RDS-TMC) unter Nutzung von ALERT-C (ISO 14819-3:2021)

This European Standard was approved by CEN on 30 July 2020.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

This document (EN ISO 14819-3:2021) has been prepared by Technical Committee ISO/TC 204 "Intelligent transport systems" in collaboration with Technical Committee CEN/TC 278 "Intelligent transport systems" the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2021, and conflicting national standards shall be withdrawn at the latest by August 2021.

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

This document supersedes EN ISO 14819-3:2013.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 14819-3:2021 has been approved by CEN as EN ISO 14819-3:2021 without any modification.

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 (see 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 (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 278, *Intelligent transport systems*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 14819-3:2013), which has been technically revised.

The main changes compared to the previous edition are as follows:

The following TISA specifications were integrated:

- Location Table Exchange Format 24.
- Reuse-of-location-codes.
- Roads-and-Junction-number-translation.
- Coding of isolated areas.
- Language identifiers.
- Backward compatibility.
- Coding of name translations and languages in TMC tables.
- DLR methods for locations in TMC Location.

A list of all parts in the ISO 14819 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document primarily addresses the needs of RDS-TMC ALERT-C messages which are in widespread worldwide use. The modular approach used here is intended to facilitate future extension of the location referencing rules to other traffic and travel messaging systems.

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.

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 may 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.

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

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. This certification procedure extends the basic rules mentioned in this standard and also applies a best-practice validation. TISA grants a stamp of quality to those location tables that pass a set of tests.

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 document specifies location referencing rules to address the specific requirements of Traffic Message Channel (TMC) systems, which use abbreviated coding formats to provide traffic and travel information (TTI) messages over mobile bearers (e.g. GSM, DAB) or via exchange protocols like DATEX II. In particular, the rules address the Radio Data System-Traffic Message Channel (RDS-TMC), a means of providing digitally-coded TTI to travellers using a silent data channel on FM radio stations, based on the ALERT-C protocol.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 639-1, *Codes for the representation of names of languages — Part 1: Alpha-2 code*

ISO 14819-1, *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 15924, *Information and documentation — Codes for the representation of names of scripts*

3 Terms, definitions and abbreviated terms

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

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

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	extended country code
EDIFACT	Electronic data interchange for administration commerce and transport

GDF	geographic data files (for modelling and exchange of geographic data for transport telematics applications)
LC	location code
LTCC	location table country code
LTN	location table number
POI	point of interest
RDS	radio data system (digital information channel on FM sub carrier)
TIC	traffic information centre
TISA	Traveller Information Services Association
TMC	traffic message channel
TTI	traffic and travel information
WGS84	World Geodetic System 1984

4 Location coding

4.1 General

Location references used by RDS-TMC are covered by the location referencing rules defined in this subclause. The ALERT-C coding protocol for RDS-TMC is defined in ISO 14819-1.

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.

In ALERT-C, a further 2048 numbers shall be reserved for INTER-ROAD (see ISO 14819-1) 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 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. The INTER-ROAD location 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 the successful use of the table and associated TMC service. A new version of an existing location table shall remain compatible with the previous versions of the same location table – the changes shall 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 re-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 [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 may 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 recognize 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 organizations 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.

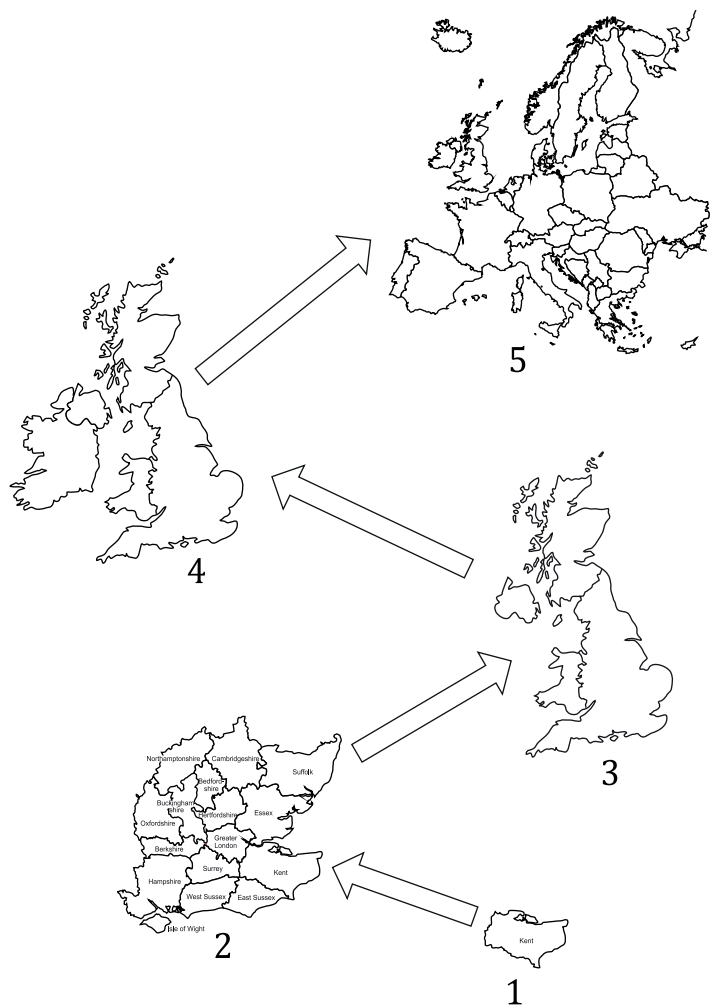
The location table exchange format specifies the information that shall be provided as part of a location table, and the way in which it is to be presented. The location table exchange format aims to provide a complete and precise description of a TMC location table, that is readable from software programmes without any changes or adaptations.

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 pre-defined fields. The method for using the location table exchange format is defined in [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 can be referenced up to the UK, then the British Isles, then Europe, etc. (see [Figure 1](#)).



- Key**
- 1 County of Kent
 - 2 South East England
 - 3 United Kingdom
 - 4 British Isles
 - 5 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 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.

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](#).

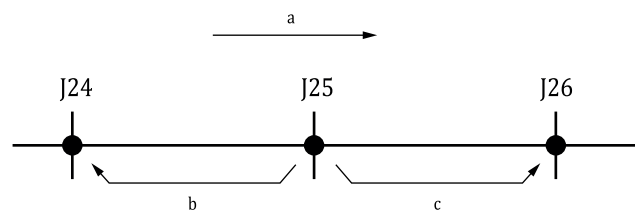
Subtypes can be used to give further details of (for example) facilities available at a particular location, such as a service area. The current list, in [Annex A](#), will be added to as further needs are agreed.

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

4.2.6 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 can 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 (see [Figure 2](#)).



- a Positive direction.
- b Negative offset.
- c Positive offset.

Figure 2 — Offsets

4.2.7 Direction of the road

The pre-defined direction of the road (see [4.2.6](#)) 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 as positive.

It is not permitted in any case 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 the RDS-TMC service and location tables are organized and defined on a country-by-country basis.

Each service will by default use a location table uniquely identified by a combination of a location table number (LTN), a location table country code (LTCC) and a location table extended country code (LTECC).

The LTN is a decimal value in the range 1...63. The LTCC is in the range 1...15 (hexadecimal 1...F) and the LTECC comprises two hexadecimal characters. The combination of LTCC, LTECC, LTN and the location code within the table defines an extended location code, which is unique worldwide.

A country may use several location tables, and a transmission, although having a 'default' location table, may include messages from adjacent areas with different location tables, using the INTER-ROAD feature, described in ISO 14819-1.

TISA has established an allocation of LTNs for each country, given in [Annex B](#). As far as possible, the allocated combinations of LTCC and LTN define a location table uniquely, regardless of the LTECC. This ensures support for countries where, for historical reasons, the LTECC has not been transmitted.

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 standardized and specified in [Annex A](#). Exceptionally, new subtypes may be proposed to ISO/TC 204 and CEN/TC 278 for approval, registration and publication. 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.

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

For types for which a subtype is not 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,
- road/junction number,
- road name,

- first name,
- second name,
- area reference,
- linear reference,
- negative offset,
- positive offset,
- urban,
- intersection reference,
- WGS84 co-ordinates (longitude and latitude).

Not all of these items shall be present in every record. [Table 1](#) indicates which references are required and/or allowed, according to location type.

Table 1 — Content of location table for ALERT-C

Loc- ation code	Code of location (sub) type ⁴	Road/ junction number	Road name	First name	Second name	Area reference	Linear reference	Negative offset	Positive offset	Urban	Inter- section reference	WGS84 co-ordi- nates	Interrupts road
(M)	continent	-	-	name (M)	-	-	-	-	-	-	-	-	-
	country group	-	-	name (M)	-	country group or continent (M)	-	-	-	-	-	-	-
	country	-	-	name (M)	-	country group or continent (M)	-	-	-	-	-	-	-
	other area (water area, fuzzy area, application region)	-	-	name (M)	-	lowest order ad- ministrative area or other area (m)	-	-	-	-	-	-	-
	<i>n</i> th order area (<i>n</i> = 1 to 5)	-	-	name (M)	-	<i>n</i> th order area (M)	-	-	-	-	-	-	-
(M)	road	(m) ²	(m) ²	negative end name (M)	positive end name (M)	<i>n</i> th order area or country (M)	-	-	-	-	-	-	-
	ring road	(m) ²	(m) ²	name (O)	-	<i>n</i> th order area or country (M)	-	-	-	-	-	-	-
	<i>n</i> th order segment (<i>n</i> = 1, 2)	(m) ²	(m) ²	negative end name (M)	positive end name (M)	<i>n</i> th order area or country or other area (O)	first order segment, road or ring road (M)	preceding <i>n</i> th order seg- ment (m)	subsequent <i>n</i> th order segment (m)	-	-	-	-
	urban street	(m) ²	(M)	name (O)	name (O)	<i>n</i> th order area or other area (M)	-	-	-	-	-	-	-
	vehicular link	-	(m)	negative end name (M)	positive end name (M)	<i>n</i> th order area or other area (O)	-	-	-	-	-	-	-
	link road	-	-	origin road number and origin end name (M) ⁵	destination road number and destination end name (M) ⁵	lowest order ad- ministrative area or other area of the intersection to which the link road belongs (m)	-	-	-	-	-	-	-
	parallel road	(m) ¹¹	(m) ¹¹	negative end name (M) ¹²	positive end name (M) ¹²	lowest order ad- ministrative area or other area (M)	-	-	-	-	-	-	-

Table 1 (continued)

Loc- ation code	Code of location (sub) type ⁴	Road/ junction number	Road name	First name	Second name	Area reference	Linear reference	Negative offset	Positive offset	Urban	Inter- section reference	WGS84 co-ordi- nates	Interrupts road
Point													
(M)	junction	(m) ³	(O) ³	junction name (m) ³	road number or name of intersecting road (O) ³	lowest order ad- ministrative area or other area (M)	lowest order segment, road or ring road (M)	preceding point (m)	subsequent point (m)	(M)	(m)	(M)	(m) ⁹
(M)	intermediate point	-	-	point descriptor (M)	-	lowest order ad- ministrative area or other area (M)	lowest order segment, road or ring road (M)	preceding point (m)	subsequent point (m)	(M)	-	(M)	(m) ⁹
(M)	other landmark point ^{1,10}	-	-	point name (M)	-	lowest order ad- ministrative area or other area (M)	lowest order segment, road or ring road (M)	preceding point (m)	subsequent point (m)	(M)	(O)	(M)	(m) ⁹
(M)	link road point junction number	(m)	(O)	junction name (m)	-	lowest order ad- ministrative area or other area (M)	link road (M)	-	-	(M)	(M) ⁶	(M) ⁷	(m) ⁹
(M)	parking POI	-	(O)	name of the parking POI ⁸	-	lowest order ad- ministrative area or other area (M)	-	-	-	(M)	-	(M) ⁸	(m) ⁹
(M)	other isolated POI ¹⁰	-	(O)	name of the isolated POI	-	lowest order ad- ministrative area or other area (M)	-	-	-	(M)	-	(M)	-

[Table 1](#) contains an overview of the content of a location table for RDS-TMC. Mandatory fields are shown by (M), while (m) means 'mandatory where it exists', and (O) means 'optional'. Fields not present are shown by '-' (dash). The first column is for explanation only. The second column, 'location code', represents the key of the table, and therefore has the entry (M) for each record in the table. The sequence of the columns in the table is not significant. Non-empty fields in the columns 'area reference', 'linear reference', 'negative offset' and 'positive offset' contain the code of the location within the same location table to which the field references. For detailed descriptions of all location types and their codes see [Annex A](#).

Explanation of Table 1's superscripts:

- ¹ 'Other points' include motorway service areas and prominent landmarks such as named major bridges and tunnels.
- ² For roads, ring roads and *n*th order segments, at least one of the two fields 'road/junction number' and 'road name' shall have a value.
- ³ For junctions, at least one of the four fields 'road/junction number', 'road name', 'first name' and 'second name' shall have a value.
- ⁴ The 'column code of location (sub)type' in this explanatory table contains descriptions of location types and subtypes. In a real location table this column contains location (sub)type codes.
- ⁵ For link roads, the field 'first name' shall be equal to the combination of the values of the field 'road number', and the field 'first name' (negative end name) or the field 'second name' (positive end name), of the lowest level of the road or segment to which the start (related to the driving direction) of the positively coded link road connects.
- ⁶ Either the first name or second name shall be selected. Of the two names, select the option which is logically considered to be the negative end name of the link road. If the first or second name of the relevant segment does not add useful information, then the respective value of a next higher level (segment or road) may be used. If the first or second name of the highest level (road) does not provide meaningful information, it is recommended to use another entry as first name.
- ⁷ In case the link road originates from both directions of the road or segment, then the value of the first name field shall only consist of the road number of the main road. Note that in this case the origin end name is not (M).
- ⁸ The field 'second name' is constructed in the same way but referring to the destination road at the end of the link, not the origin road at the start of the link.
- ⁹ For link road points, the 'intersection reference' shall be a cross-reference to a location code referring to the same junction. If the junction is coded by three or more roads, cross-references shall be represented in the location table anti-clockwise in a circular way, such that each location code references only one other location code explicitly, and the other(s) implicitly.

- 10 For link road points, the WGS84 co-ordinate value shall be the co-ordinate taken at the middle of the link road on the link road.

For parking POI points P5, if a corresponding P3 type point is also coded as P5 type, the same name shall be used for the P3 and the P5 locations. Also, if a corresponding P3 type location exists, the values shall be the same as for the P3 and P5 type location. Otherwise the co-ordinates of the approximate centre of the location shall be given. Some special rest areas beside a motorway are only reached when leaving the motorway via a motorway exit and using a regional road.

The P5.8 subtype location can be used to describe the relation to the nearest motorway entrance/exit. Only P1.3 or P1.4 subtype location shall be used as references.

- 11 For points where the field 'InterruptsRoad' has a non-zero value (i.e. the road is interrupted adjacent to that point), the last point location before the interruption shall not have a positive offset (to the first point location after the interruption) and the first point location after the interruption shall not have a negative offset (to the last point location before the interruption). Segments as defined for the road shall always refer to each other by positive and negative offsets, independent of the interruption of the road. (See [4.4.10](#) for definition of interrupted roads).

The same location shall not be coded both as a P3 location type and as a P6 location type.

- 12 If there is no specific road number or road name for the parallel road, the road number or road name from the main road to which the parallel road runs parallel shall be filled in here.

First name and second name indicate the direction of travel on the parallel road (the rule “west-east and south-north coding” shall not be applied here. See also [4.2.7](#)).

The location code of category LINEAR to which the P1.16 and P1.17 refer shall be of type L8.0.

P1.16 shall have a positive offset and no negative offset, P1.17 shall have a negative offset and no positive offset.

4.4.3 Road descriptions

4.4.3.1 Road numbers and road names

Road descriptions are normally road numbers. They shall be indicated at the highest level of the hierarchy (e.g. road/ring road) only. In addition to the road number (A1 – R0), a road name (e.g. *Autoroute du Nord*) or other road number (e.g. *E13* for *A1*) may be defined. If no road number exists, a road name is mandatory (e.g. *Boulevard Périphérique*).

Some segments of a road may carry additional numbers and/or names (e.g. *A6 - Autoroute du Soleil*, *A4 - Kölner Ring*). If a road segment belongs to more than one road, this shall lead to multiple entries in the location table. If the multiple numbers and/or names do not signify the fact that the segment is part of more than one road, they may be indicated at the segment level in the road-name field, where required. The higher-level road number still applies.

For vehicular links, the road name may be the name of a company, e.g. *Stena Sealink*; *Eurotunnel*; a geographic name, e.g. *Simplon Tunnel*, *Channel Tunnel*; or a marketing name, e.g. *Le Shuttle*.

4.4.3.2 Junction numbers

For junctions, the field road/junction number is used to describe junction numbers, where they exist.

4.4.4 Names

Names of locations shall normally be given in the language of the locality. However, it is also permissible to produce versions of location tables with place names translated into other languages (bi-lingual or multi-lingual).

The junction name may be a description as known by road users.

Negative and positive end-names may be precise (e.g. *Dover-Calais*), or approximate (e.g. *Köln-Frankfurt*). Approximate names refer to nearby places that the road (usually a motorway) does not pass directly through.

Point descriptor for intermediate points shall be mandatory. Where required, they may be given in terms of kilometre/milepost references.

4.4.5 Upward references

Two paths shall normally be provided for upward referencing in ALERT-C (see ISO 14819-1). The first is for area references, the second is for linear references. Additional upward referencing paths may be used, but this is not required as part of the minimum standard for exchange purposes.

Upward references shall normally point to the next defined higher level. For example, a second order area shall reference a first order area; a first order area shall reference a country.

4.4.6 Offsets

Offsets may be defined for n th order segment locations, and for all types of point locations.

4.4.7 Urban

The values in this column indicate whether the traffic on the point location has a mainly urban character (1) or inter-urban character (0).

4.4.8 Intersection reference

The intersection reference is a cross-reference to a location code, representing the same real-world point location, but related to another road, if the locations are in the same table, or to the same road in another table. If the location belongs to three or more roads, cross-references are represented in the location table anti-clockwise in a circular way (see [Table 2](#)), such that each location code references only one other location code explicitly, and the other(s) implicitly. The intersection reference shall include country code and table number if it refers to another table.

The intersection reference may also be used as a cross reference of a link road point location to the location code of the intersection to which it belongs, i.e. the intersection code on the road from which the link road, taken in the positive direction, originates.

Table 2 — Intersection reference – Coding example

Location code	Code of location (sub)type	...		Linear reference		Intersection reference
1	L1.1					
2	L1.1					
3	L1.1					
4	P1.1			1		5
5	P1.1			2		6
6	P1.1			3		4

4.4.9 WGS84 co-ordinates

For each point location the WGS84 longitude and latitude of the (approximate) centre of the location shall be given (M), in decimal degrees with 5 micro degrees resolution, with a plus sign (+) for eastern longitude and northern latitude, and a minus sign (-) for western longitude and southern latitude. Degrees longitude are given in three digits (with leading zeros if needed), degrees latitude in two digits (with leading zeros if needed) without any separator between the entire part and the decimal part.

EXAMPLE +00435455 +5083940 represents 4°.35455 E 50°.83940 N

4.4.10 InterruptsRoad

An interrupted road is a road of which an intermediate part is not present. The following situation examples can be distinguished:

- two parts of a road (with the same name) are connected by a road with a different name;
- two parts of a road (with the same name) are connected by a (water or train) ferry;
- two parts of a road (with the same name) are disconnected, because the intermediate part has not (yet) been built.

The value of the field "InterruptsRoad" is numeric and shall be defined for each point location except for point type P6, 'other isolated POI'. The following numeric values are defined for this field:

- If the point location is the last point location before the interruption, as defined by the pre-defined direction of the road, the field "InterruptsRoad" shall contain the location code of the next point location (after the interruption). This provides a functionality which is similar to a normal offset and, in addition, indicates the situation of interruption of the road.
- If the point location is the first point location after the interruption, as defined by the pre-defined direction of the road, the field "InterruptsRoad" shall contain the location code of the previous point location (before the interruption). This provides a functionality which is similar to a normal offset and in addition indicates the situation of interruption of the road.
- If the point location is not the first or the last point location, respectively before or after the interruption, then the field "InterruptsRoad" shall have value 0.
- For points where the field 'InterruptsRoad' has a non-zero value (i.e. the road is interrupted adjacent to that point), the last point location before the interruption shall not have a positive offset (to the first point location after the interruption) and the first point location after the interruption shall not have a negative offset (to the last point location before the interruption). Segments as defined for the road shall always refer to each other by positive and negative offsets, independent of the interruption of the road.

4.5 Detailed junction referencing

4.5.1 Conventional junctions

Lanes and slip roads are not individually numbered locations in ALERT-C. They are addressed within the structure of ALERT-C messages (e.g. first exit; second exit; or 'for traffic preceding towards <destination>').

4.5.2 Complex junctions

In more complex situations where coding of parallel access roads, link roads and slip roads is required, they shall all be referenced as point locations of the main highway, and shall be coded as separate records in the location table without positive or negative offset references to other point locations. Alternatively, link roads may optionally be coded in detail as described in [4.5.3](#). Parallel access roads shall not be coded as normal chains or as isolated locations, but shall be coded in detail as described in [Annex C](#).

4.5.3 Detailed coding of link roads

4.5.3.1 Introduction

An optional method has been defined that allows the detailed coding of one-directional link roads connecting two different motorways. The method may be applied to any one-way traffic link road, however not to bi-directional link roads or to other parallel roads. The method may be applied to code link roads at any or all of the motorway intersections in a location table.

4.5.3.2 Approach

A link road coded using this optional method shall be considered to be a normal road and coded accordingly. Each link road that is thus referenced shall be coded as a separate linear location with one point location, represented by at least two records in the location table:

- link road as linear location of type link road;
- link road as point location of type link road point.

The linear location shall have no linear reference. The point location shall have a linear reference to the corresponding linear location.

4.6 Detailed situation locations

4.6.1 Introduction

In addition to normal location referencing, detailed and precise location referencing methods are defined for use in ALERT-C. Detailed location referencing is an optional method that may be used where necessary.

4.6.2 Normal location referencing

In most TMC location tables, locations are pre-defined only at junctions and at other prominent landmarks, e.g. service areas; prominent, named tunnels and bridges.

Where necessary, the detailed location of an event (such as an accident or the start or end of roadworks) may be defined in the message by its distance from the pre-defined primary location, using the 'precise location referencing' method described in [4.6.4](#).

4.6.3 Detailed location referencing

It is permissible to define intermediate points between junctions, at locations specified only in terms of a kilometre/milepost reference.

Such intermediate points may be used to give more detailed information about, for example, the location of an accident, or the start and end of roadworks.

Intermediate locations may also be used to define traffic monitoring points, for example, for use in systems where it is proposed to indicate monitored traffic speeds directly.

4.6.4 Precise location referencing

Precise location referencing is an optional method that may be used where it is desirable to indicate a precise location using a combination of a pre-defined location reference and a distance offset along the road. A method has been defined for describing the offset without ambiguity. The method is described in detail in [Annex C](#).

4.7 One- and two-way locations

4.7.1 Basic principles

All TMC locations on two-way roads refer to both directions of travel. It is not permissible to code each direction of travel separately, unless the carriageways are physically separated to the extent that drivers perceive them as two separate roads.

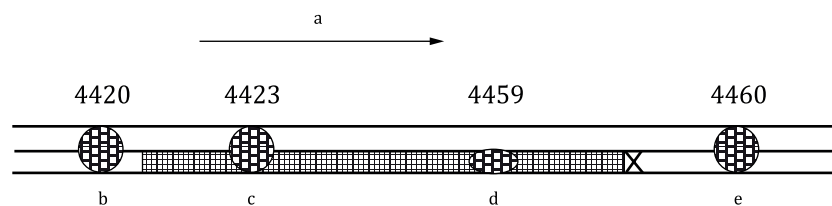
4.7.2 Junctions

Junctions are only coded once, not once in each direction. Also, the entry and exit points of slip roads and/or connecting roads in a junction shall only be separately coded if done as part of providing detailed coding of link roads according to [4.5.3](#). However, where entry and/or exit points are very widely separated, it is permissible to code them as separate junctions, if desired. The criterion for deciding whether to do this shall be: do drivers perceive them as separate junctions? (i.e. are they differently named and/or numbered?).

4.7.3 Locations with only an exit or entry and locations occurring on one side only

4.7.3.1 General

Some locations only have an exit or an entry, on one or on both sides. Other locations appear only on one side of the motorway. Examples of the latter are locations like service stations, tunnels, bridges. For such locations, the use of extra attributes is strongly recommended. An example is presented in [Figure 3](#) and [Table 3](#).



Key

a Positive direction.

b Bridge.

c Junction J1.

d Parking.

e Junction J2.

location

traffic queue

X accident

Figure 3 — Service area on one carriageway only

4.7.3.2 Using extra attributes for each location code

The specific possibilities of a point location are described by six extra attributes:

- a) **In +**
Possibility to enter the road in positive direction
(0 = disabled / 1 = enabled)
- b) **Out +**
Possibility to leave the road in positive direction
(0 = disabled / 1 = enabled)
- c) **In -**
Possibility to enter the road in negative direction
(0 = disabled / 1 = enabled)
- d) **Out -**
Possibility to leave the road in negative direction
(0 = disabled / 1 = enabled)
- e) **Present +**
To indicate presence of location in positive direction
(0 = not present / 1 = present)
- f) **Present -**
To indicate presence of location in negative direction
(0 = not present / 1 = present)

Table 3 — Use of extra attributes - Example

loc. Code	Code of loc. (sub) type	Road/ junction number	First name	...	Neg. offset -	Pos. offset +	..	In +	Out +	In -	Out -	Pre-sent +	Pre-sent -
4420	P3.2		Bridge	...	4456	4423	..	0	0	0	0	1	1
4423	P1.3	J1	Junction J1	...	4420	4459	..	1	1	1	1	1	1
4459	P3.3		Parking	...	4423	4460	..	1	1	0	0	1	0
4460	P1.3	J2	Junction J2	...	4459	4461	..	1	1	1	1	1	1

Each point location, independent from its attributes, now is referenced in both directions, using offset (+) and offset (-). The attributes *in +*, *out +*, *in -*, *out -*, *present +* and *present -* limit the possibilities of the operator to choose specific offsets on transmitter side.

The major advantage of this method is the opportunity to easily change the referencing at changes of the real situation without the necessity to update the location tables of all receivers.

EXAMPLE If the parking in the example becomes available to traffic on both sides, simply enabling '*in -*' and '*out -*' and setting *present -* to 1 for location nr. 4459 is sufficient for adapting to the new situation.

The extra attributes may be ignored on the receiver side. The use of 'illegal' combinations of locations and offsets is not allowed to the operator of the transmitter system, so messages that are broadcasted are always valid.

4.7.4 DiversionPos/DiversionNeg

DiversionPos: To indicate the name (characters or numbers) of a fixed predefined diversion route in positive direction starting at this point location (e.g. J = fixed diversion route 'J')

DiversionNeg: To indicate the name (characters or numbers) of a fixed predefined diversion route in negative direction (K = fixed diversion route 'K')