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Inteligentni transportni sistemi - Sporočila prometnih in potovalnih informacij prek kodiranih prometnih sporočil - 1. del: Kodirni protokol za radijski podatkovni sistem - Prometni informacijski kanal (RDS-TMC), ki uporablja sistem ALERT-C (ISO/DIS 14819-1:2019)

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/DIS 14819-1:2019)

Intelligente Transportsysteme - Verkehrs- und Reiseinformationen über Verkehrsmeldungskodierung - Teil 1: Kodierungsprotokoll für den digitalen Radiokanal für Verkehrsmeldungen (RDS-TMC) unter Nutzung von ALERT-C (ISO/DIS 14819-1:2019)

Systèmes intelligents de transport - Informations sur le trafic et le tourisme via le codage de messages sur le trafic - Partie 1: Protocole de codage pour le système de radiodiffusion de données (RDS) - Canal de messages d'informations sur le trafic (RDS-TMC) avec ALERT-C (ISO/DIS 14819-1:2019)

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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

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

Partie 1: Protocole de codage pour le système de radiodiffusion de données (RDS) — Canal de messages d'informations sur le trafic (RDS-TMC) avec ALERT-C

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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. www.iso.org/directives

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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

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

This third edition cancels and replaces the second edition (ISO 14819-1:2013), which has been technically revised.

This third edition cancels and replaces all previous versions.

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 (to become deprecated): 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:

— Additional tuning variants have been added to allow referencing of TMC services using the 64MHz to 88 MHz band.

— The method of encrypting an RDS-TMC service, previously separately specified in 14819-6, has been merged into this specification, as Section 8: consequently, some renumbering of sections has occurred.

— In places the text has been improved for greater clarity. Several typographical and grammatical errors have been corrected.

Introduction

Traffic and traveller information (TTI) may be disseminated through a number of services and means of communication to the end user, including static displays (e.g. Variable Message Signs), broadcast audio to car radios, broadcast data services to in-vehicle equipment (e.g. installed navigation system) and to nomadic device terminals (e.g. portable navigation device).

For all such services, the data to be disseminated and the message structure involved in the various interfaces require clear definition and standard formats, in order to allow competitive products to operate with any received data.

This part of ISO 14819 describes the data specification for TTI messages, together with their network layer and their service layer, which shall be conveyed by the RDS-TMC feature, specified in IEC 62106.

The TTI information chain, from event to end-user is quite complex and the TISA (the Traveller Information Services Association) value chain shown in Figure 1 helps to understand the key components:

Figure 1 — The Traveller Information Services Association TTI value chain

Several entities (e.g. companies, businesses) take part in one or more activities to complete the activities shown in the value chain,. wo, in particular are described, for improved understanding:

Service Provider: An organisation that constructs a data service, by gathering data, processing data and supplying the data service. A Service Provider then negotiates for the use of the necessary data bandwidth with a Broadcaster and/or Transmission Operator. A Service Provider is responsible for the "quality" of the data to his customers and must provide suitable customer support.

Broadcaster: A traditionally incorporated organisation responsible for a continuous strand of audio programmes and their quality. A broadcaster may also be responsible for overall co-ordination of "broadcast transmissions" (often a Broadcaster is the licensee of a national regulator). A Broadcaster may also be a Service Provider.

TTI services for travellers, using spoken radio reports and in-vision reports occupy broadcast air-time and whilst valuable to some, they are considered less useful by others, furthermore, only some are useful for travellers on the move. Due to the widespread adoption of the Radio Data System, in VHF/FM broadcasting on Band II there is the possibility of transmitting coded TTI messages digitally and "silently" using the RDS-TMC feature, which avoids the interruption of planned programmes. This TTI delivery method hasseveral advantages: TTI messages can be decoded into the language of the end user, regardless of location, more messages can be made available and planned broadcast programme interruption is avoided. Thus, using RDS-TMC makes the delivery of TTI messages more timely and topical.

The ALERT-C protocol defined in this standard supports a data broadcasting service for travellers, providing information about many kinds of traffic and travel events. Messages include traffic incident information relating to national and regional routes and some urban roads and other information required by a traveller, such as roadworks and weather information.

This part standard is based on the ALERT-C traffic message coding protocol, which was a product of DRIVE Project V1029, "RDS Advice and Problem Location for European Road Traffic". The RDS-ALERT project aimed to define standards for RDS-TMC, working in conjunction with the European Broadcasting Union (EBU) and the European Conference of Ministers of Transport (ECMT).

The standard has been implemented in many countries worldwide and, after very extensive implementation experience, it has matured with many changes from the earliest version of the

ALERT-C proposal of 1990. At that time CEN TC278 Sub-working group (SWG) 4.1 developed the coding protocol, herein and the event list described in ISO 14819-2; meanwhile CEN TC278 SWG 7.3 developed the location referencing method which is described in ISO 14819-3. Subsequently the TMC Forum was responsible for collecting specific additions and improvements intended for inclusion in this standard. In 2008 the Traveller Information Services Association (TISA) took over all responsibility (including TMC Forum legacy) for maintenance of this part of ISO 14819, which now includes an up to date set of industry supported enhancements to RDS-TMC.

The RDS system is fully described in IEC 62106 and it contains the 'hooks' to RDS-TMC, detailed in this standard; it employs a group-structured data protocol. Terminal Device manufacturers should be aware that Service Providers shall broadcast the following RDS groups;

i. type 3A groups that carry the TMC Open Data Application (ODA) identification and service and network layer information – identifying TMC services uniquely worldwide.

ii. type 8A groups that carry RDS-TMC messages and location information, together with TMC service tuning information.

iii. type 4A groups that contain the Clock Time (CT) information, that is used as the time reference within TMC.

Additionally, according to need, the following group may also be transmitted:

iv. type 0A groups that contain Alternative Frequency (AF) information, that is used as an alternative to, or in addition to, tuning information carried in the type 8A group;

It must also be noted that although the 'message' information carried within the 8A group will be transmitted once with either one or two 'immediate' repeats (see section 7.3), the encryption administration information and the tuning information, both also transmitted in type 8A groups, usually will not be transmitted with an 'immediate' repeat: this information is largely 'static' and repeated periodically only every several seconds or minutes. Terminal Devices therefore shall process every RDS group received that passes its CRC and use the data contained within once it has been verified by the reception of a second identical group, regardless of whether received 'immediately' or after several seconds or minutes.

Broadly two types of RDS-TMC services are in use: one that is broadcast without access control, and one that is broadcast with access control. The method of 'access control' was designed in 2000 and was separately published in ISO 14819-6, and described how a service provider encrypted their service, the complementary process to be adopted by terminals to decrypt the service by arrangement with the service provider and indicated a strategy to be followed to introduce encrypted services between 2001 and 2003, when encryption was expected to become widespread. As encrypted RDS-TMC services are now widespread, the details in ISO 14819-6 have now also been merged within this specification and consequently ISO 14819-6 has been withdrawn.

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

1 Scope

1.1 General scope

The ALERT-C protocol is designed to provide mostly **event-oriented road end-user information** messages. Many "hooks" have been left for future development and indeed a **few status-orientated road end-user information** messages were included.

1.2 Content

The presentation section of the ALERT-C protocol specifies messages that may be presented to the user in accordance with the general requirements set out above. It defines the message structure and content, and its presentation to the end-user.

The ALERT-C protocol utilises a standardised Event List) of event messages with their code values, which also includes general traffic problems and weather situations. Being transmitted as a series of codes, RDS-TMC messages are language-independent and can be presented in the language of the user's choice.

ALERT-C defines two categories of information within messages: basic and optional items. In principle, basic information is present in all messages. Optional information can be added to messages where necessary.

Standard RDS-TMC user messages provide the following five basic items of explicit, broadcast information:

1. **Event description**, giving details of road event situation, general traffic problems and weather situations (e.g. congestion caused by an accident) and where appropriate its severity (e.g. resulting queue length).
2. **Location**, indicating the area, road segment or point location where the source of the problem is situated.
3. **Direction and Extent**, identifying the adjacent segments or specific point locations also affected by the incident, and where appropriate the direction of traffic affected.
4. **Duration**, giving an indication of how long the problem is expected to last.
5. **Diversion advice**, showing whether end-users are recommended to find and follow an alternative route.

Optional information can be added to any message using one or more additional RDS data groups. This optional addition can give greater detail or can deal with unusual situations. Any number of additional fields can in principle be added to each basic message, subject only to a maximum message length of five RDS data groups.

1.3 Message management

The message management component deals with the message management functions of RDS-TMC. The ALERT-C protocol distinguishes between user messages and system messages. User messages are those potentially made known to the end-user, as defined in the presentation section. System messages are of use only to the RDS-TMC terminal, for message management purposes.

1.4 Transmission

The transmission component conveys the messages over-air. The ALERT-C protocol, which RDS-TMC uses, has the fundamental approach of aiming to code most messages entirely within a single RDS group.

RDS-TMC information comprises both 'system information' and 'user messages'. System information relates to the TMC service, and details the parameters that the terminal needs to be able to find identify and decode the TMC information. System information is transmitted in type 3A groups and in type 8A groups.

User messages contain the details of the traffic events; these may use one or more type 8A groups. Most messages may be transmitted using a single type 8A group, however messages with more detail (e.g. diversion advice) may use up to a total of five, type 8A groups.

1.5 Event list

The ALERT-C Event List contains all event descriptions. It is described in ISO 14819-2.

2 Normative references

The following referenced documents are indispensable for the application 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 14819-2, *Intelligent transport systems — Traffic and travel information messages via traffic message coding — Part2: Event and information codes for Radio Data System — Traffic Message Channel (RDS-TMC) using ALERT-C*

ISO 14819-3, *Intelligent transport systems — Traffic and travel information messages via traffic message coding — Part3: Location referencing for Radio Data System — Traffic message Channel (RDS-TMC) using ALERT-C*

IEC 62106:2018, *Specification of the radio data system (RDS) for VHF/FM sound broadcasting in the frequency range from 64.0 to 108.0 MHz MHz*

3 Terms and definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1.1
Access Profile
An Access Profile uniquely describes a particular RDS-TMC service and subscription period.

3.1.2
Alternative Frequency
An Alternative Frequency is defined in the RDS specification IEC 62106 as a frequency used by a transmitter in an immediately adjacent area that carries the same audio programme service as the Tuned programme. Several AFs are transmitted together in a list. Where the TMC service uses the same Network as an audio service, this AF list is also used for following the TMC service.

3.1.3
Application Identification
The Applications Identification is defined in the RDS specification IEC 62106 and signals the specific group type used by the Open Data Application

3.1.4
Continuity Index Field
The purpose of the Continuity Index Field is to help distinguish between different multi-group messages

Note 1 to entry: All groups within any particular multi-group message contain the same value of this continuity index.

3.1.5
Country Code
The Country Code associated with an RDS-TMC service is a non-zero integer transmitted as the Location Table Country Code (LTCC); or if that value is zero, the Programme Identification Country Code PICC.

Note 1 to entry: Defined in the RDS specification IEC 62106.

3.1.6
Direction and Extent
Identifying the adjacent segments or specific point locations also affected by the incident, and where appropriate the direction of traffic affected

3.1.7
Diversion Advice
Showing whether end-users are recommended to find and follow an alternative route

3.1.8
Duration
Giving an indication of how long the problem is expected to last

3.1.9
Encryption Identifier
The Encryption Identifier is a value indicating which line in the Service Key table of parameters the service provider is using in the encryption process that day. It is transmitted in type 8A group variant 0.

3.1.10
End-user
In this specification, end-user is used to cover the meaning for all possible terminal clientsThis could be a vehicle driver, a user of a portable or fixed TMC receiver or an intelligent client that processes the information such as in a navigation system.

3.1.11
Event Description
Giving details of the traffic problem (e.g. congestion caused by an accident) and where appropriate its severity (e.g. resulting queue length) or weather situation

3.1.12
Event List
An agreed table of event descriptions and parameters, assigned an event code value giving details of traffic problem (e.g. congestion caused by accident) and where appropriate its severity (e.g. resulting queue length) or the weather situationThe Event List is defined in EN ISO 14819-2.

3.1.13
Expiry Date
The date determined by the service provider on which a particular terminal's ability to decrypt an encrypted service should cease (i.e. the end of the paid subscription period).

3.1.14
Extended Country Code
The Extended Country Code associated with an RDS-TMC service is a non-zero eight-bit code transmitted as the Location Extended Table Country Code (LTECC); or if that value is zero, or not transmitted, the Extended Country Code ECC, transmitted in RDS type 1A group.

3.1.15
Foreign Location Table
A location table different from the default location table used by the transmitter

3.1.16
INTER-ROAD
A way of referencing locations from other location tables via special multi-group messagesThese messages can be used to inform end-users about problems in other areas, particularly in neighbouring countries or regions.

3.1.17
Location
Indicating the area, road segment or point location where the source of the problem is situated

3.1.18
Location Table
An agreed location table for each service which contains information to indicate the area, road segment or point location where the source of the problem is situatedEach Location Table is identified by three elements: a number – Location Table Number, a Location Table Country Code, and a Location Table Extended Country Code. The combination of these three elements identifies a Location Table uniquely. The combination of these three elements identifies a location table uniquely.

3.1.19
Location Table Number
An integer number 1...63, one of the elements identifying a Location Table. The Location Table Number is transmitted in type 3A groups.

3.1.20
Location Table Number Before Encryption
An integer number 1...63 used to identify the Location Table used by the service provider prior to the codes within the table being encrypted for transmission. LTNBE is transmitted in type 8A groups.

3.1.21
Location Table Country Code
A Location Table Country Code is assigned to each location database, based on the country/countries the TMC service covers

3.1.22
Location Table Extended Country Code
A Location Table Extended Country Code is assigned to each location database based on the country/countries the TMC service coversTogether the LTECC, LTCC and LTN identify a location database uniquely.

3.1.23
Open Data Application
Open Data Application is defined in the RDS specification IEC 62106 and provides the means for adding applications to an RDS transmission: RDS-TMC in an Open Data Application within an RDS transmission

3.1.24
PIN Code
The PIN code is a numeric or alphanumeric code required to be entered into a terminal before that terminal is permitted to present decrypted RDS-TMC messages. The value of the PIN code is calculated by the terminal manufacturer from an algorithm using terminal serial number and one or more access profiles as factors.

3.1.25
Programme Identification
The Programme Identification code is defined in the RDS specification IEC 62106 and assigns a code to each audio programme source

3.1.26
Programme Identification Country Code
The Programme Identification Country Code is the first four bits of the sixteen-bit Programme Identification Code.Usually the Programme Identification Country Code and the Location Table Country Code on an RDS-TMC transmission have the same value, but not always nor necessarily.

3.1.27
Serial Number
An alphanumeric identifier, unique to a terminal (or group of terminals), determined by the manufacturer.

3.1.28
Service-ID
The Service ID is used to uniquely identify a TMC service from a Service Provider.

3.1.29
Service Key
A number given in confidence by a service provider to a terminal manufacturer, identifying which one of eight possible encryption tables the service is using for encryption. The Service Key is NOT transmitted.

3.1.30
Silent Cancellation Message
The Event List contains many silent cancellation messages descriptions which are used to delete messages from the end-user terminal

3.1.311
System Information
System Information enables an RDS-TMC terminal to decode and evaluate essential data, which describes the transmission being receivedSystem Information indicates an RDS-TMC service and comprises some service characteristics needed to select the RDS-TMC service.

3.1.32
Terminal
RDS-TMC terminals provide the user interfaces with the TMC serviceTheir functionality may cover a range of terminal functions from simple terminals with a limited message repertoire and restricted location database to more sophisticated terminals offering full TMC message features and/or a wide range of strategic and tactical location databases.

3.1.33
Tuning Information
enables a RDS-TMC terminal to change from one transmitter to another at boundaries of a transmitter's coverage

Note 1 to entry: Each transmitter should direct the RDS-TMC terminal to specific frequencies or TMC services in adjacent areas.

3.1.34
User Message
describes the messages which are potentially made known to the end-user

Note 1 to entry: They contain event, location, direction and extent, duration etc. descriptions.

3.1.35
TISA
not-for-profit membership organisation established under Belgian law aiming at developing and maintaining worldwide traffic and traveller information standards such TMC and TPEG