BS EN ISO 14819-1:2021

BSI Standards Publication

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

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Full document details: BS EN ISO 14819-1:2021

National foreword

This British Standard is the UK implementation of EN ISO 14819-1:2021. It is identical to ISO 14819-1:2021. It supersedes BS EN ISO 14819-1:2013, which is withdrawn.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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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 14819-1:2021)

Systèmes de transport intelligents - Informations sur le trafic et les déplacements via le codage de messages sur le trafic - Partie 1: Protocole de codage pour le système de radiodiffusion de données - canal de messages d'informations sur le trafic (RDS-TMC) avec Alert-C (ISO 14819-1:2021)

Intelligente Transportsysteme - Verkehrs- und Reiseinformationen über Verkehrsmeldungskodierung - Teil 1: Kodierungsprotokoll für den digitalen Radiokanal für Verkehrsmeldungen (RDS-TMC) unter Nutzung von ALERT-C (ISO 14819-1:2021)

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

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European foreword

This document (EN ISO 14819-1:2021) 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of an identical text or by endorsement, at the latest by September 2021, and conflicting national standards shall be withdrawn at the latest by September 2021.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.

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Endorsement notice

The text of ISO 14819-1:2021 has been approved by CEN as EN ISO 14819-1:2021 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).

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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 14819-1:2013), which has been technically revised. The main changes compared to the previous edition are as follows:

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

— The method of encrypting an RDS-TMC service, previously separately specified in ISO 14819-6, has been merged into this document as Clause 8. Consequently, some renumbering of sections has occurred and encryption-specific terms, definitions and abbreviated terms have been added in Clause 3.

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

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.

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Introduction

0.1 General

Traffic and traveller information (TTI) can 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 systems) 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 document 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 the IEC 62106 series.

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

Figure 1 — 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. These are described below for improved understanding:

Service provider: An organization that constructs a data service, by gathering data, processing data and supplying the data service. A service provider 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 its customers and should provide suitable customer support.

Broadcaster: A traditionally incorporated organization responsible for a continuous strand of audio programmes and their quality. A broadcaster may also be responsible for the 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 has several 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.

0.2 ALERT-C protocol

The ALERT-C protocol defined in this document 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.

The ALERT-C protocol utilizes a standardized 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 are presented in the language of the user's choice.

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ALERT-C defines two categories of information within messages: basic and optional items. In principle, basic information is present in all messages. Optional information is 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 may be added to any message using one or more additional RDS data groups. This optional addition may give greater detail or 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.

0.3 Document development and RDS groups

This document 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 document has been implemented in many countries worldwide and, after very extensive implementation experience, it has matured with many changes compared to the earliest version of the ALERT-C proposal of 1990. At that time, CEN TC 278 Working Groups developed the coding protocol described in this document, the Event List described in ISO 14819-2 and the location referencing method described in ISO 14819-3. Subsequently the TMC Forum was responsible for collecting specific additions and improvements intended for inclusion in this document. In 2008, TISA took over all responsibility (including TMC Forum legacy) for maintenance of this document, which now includes an up to date set of industry supported enhancements to RDS-TMC.

The RDS is fully described in IEC 62106 and it contains the 'hooks' to RDS-TMC detailed in this document[1]; it employs a group-structured data protocol. Terminal Device manufacturers should be aware that service providers broadcast the following RDS groups:

a) type 3A groups, which carry the TMC Open Data Application (ODA) identification and service and network layer information, identifying TMC services uniquely worldwide;

b) type 8A groups, which carry RDS-TMC messages and location information, together with TMC service tuning information; and

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

1) In this document, many "hooks" have been left for future development and indeed a few status-orientated road end-user information messages are included.

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Additionally, where necessary, the following group may also be transmitted:

d) type 0A groups, which 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 is noted that although the 'message' information carried within the 8A group will be transmitted once with either one or two 'immediate' repeats (see 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 process every RDS group received that passes their 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 speaking, 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 published separately in ISO 14819-6. It described how a service provider encrypted their service and the complementary process to be adopted by terminals to decrypt the service by arrangement with the service provider. It also 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 been merged within this document and consequently ISO 14819-6 has been withdrawn.

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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

1 Scope

The ALERT-C protocol is designed to provide mostly event-oriented road end-user information messages.

This document specifies the messages which are presented to the user in accordance with a set of general requirements. It defines the message structure and content and its presentation to the end-user.

The message management component of this document describes 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 Clause 5. System messages are of use only to the RDS-TMC terminal, for message management purposes.

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.

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

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

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 4217, *Codes for the representation of currencies*

IEC 62106 (all parts), *Radio data system (RDS) — VHF/FM sound broadcasting in the frequency range from 64,0 MHz to 108,0 MHz*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

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

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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/

3.1.1
access profile
ACP
unique description of a particular RDS-TMC service and subscription period

3.1.2
alternative frequency
AF
frequency used by a transmitter in an immediately adjacent area that carries the same audio programme service as the tuned programme

Note 1 to entry: 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
AID
identification that signals the specific group type used by the *open data application* (3.1.23)

3.1.4
continuity index field
field that helps to 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
CC
non-zero integer transmitted as the *location table country code (LTCC)* (3.1.21), or if that value is zero, the *programme identification country code (PICC)* (3.1.27)

3.1.6
direction and extent
identifier for adjacent segments or specific point *locations* (3.1.17) also affected by the incident, and where appropriate the direction of traffic affected

3.1.7
diversion advice
advice showing whether end-users are recommended to find and follow an alternative route

3.1.8
duration
indication of how long the problem is expected to last

3.1.9
encryption identifier
ENCID
value indicating which line in the *service key* (3.1.30) table of parameters the service provider is using in the encryption process that day

Note 1 to entry: The encryption identifier is transmitted in type 8A group variant 0.

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3.1.10
end-user
all possible *terminal* (3.1.33) clients

EXAMPLE 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
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
agreed table of *event descriptions* (3.1.11) 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 situation

Note 1 to entry: The Event List is found in ISO 14918-2.

3.1.13
expiry date
date determined by the service provider on which a particular *terminal's* (3.1.33) ability to decrypt an encrypted service should cease (i.e. the end of the paid subscription period)

3.1.14
extended country code
ECC
non-zero 8-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
location table (3.1.18) which is different from the default location table used by the transmitter

3.1.16
INTER-ROAD
messaging system for referencing *locations* (3.1.17) from other *location tables* (3.1.18) via special multi-group messages

Note 1 to entry: These messages are used to inform *end-users* (3.1.10) about problems in other areas, particularly in neighbouring countries or regions.

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

3.1.18
location table
agreed location table for each service which contains information to indicate the area, road segment or point *location* (3.1.17) where the source of the problem is situated

3.1.19
location table number
LTN
integer number 1…63 used to identify the *location table* (3.1.18)

Note 1 to entry: The LTN is transmitted in type 3A groups.

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3.1.20
location table number before encryption
LTNBE
integer number 1…63 used to identify the *location table* (3.1.18) used by the service provider prior to the codes within the table being encrypted for transmission

Note 1 to entry: The LTNBE is transmitted in type 8A groups.

3.1.21
location table country code
LTCC
code (in the range 1..F [hex]) assigned to each *location* (3.1.17) database, based on the country/countries the TMC service covers

3.1.22
location table extended country code
LTECC
code (in the range 10..F [hex]) assigned to each *location* (3.1.17) database, based on the country/countries the TMC service covers

Note 1 to entry: Together the LTECC, LTCC and LTN identify a location database uniquely.

3.1.23
open data application
ODA
application which provides the means for adding applications to an RDS transmission

3.1.24
other network
ON
RDS feature

3.1.25
PIN code
numeric or alphanumeric code required to be entered into a *terminal* (3.1.33) before that terminal is permitted to present decrypted RDS-TMC messages

Note 1 to entry: The value of the PIN code is calculated by the terminal manufacturer from an algorithm using terminal *serial number* (3.1.28) and one or more *access profiles* (3.1.1) as factors.

3.1.26
programme identification
PI
identification which assigns a code to each audio programme source

3.1.27
programme identification country code
PICC
first four bits of the 16-bit *programme identification* (3.1.26) code

Note 1 to entry: Usually the programme identification country code and the *location table country code* (3.1.21) on an RDS-TMC transmission have the same value, but not always nor necessarily.

3.1.28
serial number
alphanumeric identifier, unique to a *terminal* (3.1.33) (or group of terminals), determined by the manufacturer

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3.1.29
service-ID
SID
ID that is used to uniquely identify a TMC service from a service provider

3.1.30
service key
SVK
number given in confidence by a service provider to a *terminal* (3.1.33) manufacturer, identifying which one of eight possible encryption tables the service is using for encryption

Note 1 to entry: The service key is not transmitted.

3.1.31
silent cancellation message
description which is used to delete messages from the *end-user* (3.1.10) *terminal* (3.1.33)

3.1.32
system information
information that enables an RDS-TMC *terminal* (3.1.33) to decode and evaluate essential data, which describes the transmission being received

Note 1 to entry: System information indicates an RDS-TMC service and comprises some service characteristics needed to select the RDS-TMC service.

3.1.33
terminal
device that provides the user interfaces with the TMC service

Note 1 to entry: The functionality of the terminal covers a range of functions from simple terminals with a limited message repertoire and restricted *location* (3.1.17) database to more sophisticated terminals offering full TMC message features and/or a wide range of strategic and tactical location databases.

3.1.34
tuning information
information that enables an RDS-TMC *terminal* (3.1.33) to change from one transmitter to another at boundaries of a transmitter's coverage

3.1.35
user message
message that is potentially made known to the *end-user* (3.1.10)

Note 1 to entry: User messages contain descriptions of event, *location* (3.1.17), *direction and extent* (3.1.6), *duration* (3.1.8), etc.

3.1.36
Traveller Information Services Association
TISA
not-for-profit membership organization established under Belgian law aimed at developing and maintaining worldwide traffic and traveller information standards such as TMC and TPEG

3.2 Abbreviated terms

AFI	alternative frequency indicator
ALERT-C	Advice and Problem Location for European Road Traffic, Version C
BCD	binary coded decimal
CT	clock time

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EBU	European Broadcasting Union
ECMT	European Conference of Ministers of Transport
FLT	foreign location table
IVR	interactive voice response
MGS	message geographical scope
RDS	radio data system
rfu	reserved for future use
TMC	traffic message channel
TN	tuned network
UTC	Universal co-ordinated time

4 Application

4.1 General

Spoken broadcast traffic messages provide a valuable information service to motorists in countries throughout the world. The widespread adoption of the Radio Data System (RDS) enables traffic messages to be carried digitally and silently using the Traffic Message Channel (TMC) feature of RDS, specified in this document, without interrupting the audio programme.

The ALERT-C protocol defined in this document supports a digital, silent broadcast service for motorists, providing information about many kinds of traffic events. This includes roadworks, weather and traffic incident information relating to major national and international routes, regional routes and local roads.

Some basic information about public transport is included within the scope of the current protocol for the special case of ferries and short rail links designed to carry road vehicles, such as Alpine tunnels or the Channel Tunnel.

4.2 Definition of the TMC "travel service"

ALERT-C defines the TMC as a travel service digitally and silently broadcast using RDS, which provides an end-user with:

— event orientated end-user information on the nature, severity and probable evolution of both urban and interurban traffic problems;

— reduced frustration and uncertainty due to this provision of timely and helpful information;

— assistance with journey planning, including rerouting and rescheduling of trips to avoid current or projected strategic traffic situations;

— details of local traffic incidents which can be avoidable using minor diversions;

— status-orientated information on traffic conditions which can help to support intelligent on-vehicle route guidance equipment; and

— additional data on roadside amenities and tourism information which can in future complement and update on-vehicle mobile databases.

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4.3 TMC virtual terminal

Information broadcast digitally and silently can only be interpreted by suitable RDS-TMC terminals. These RDS-TMC terminals provide the user interfaces with the TMC service. Their functionality can vary substantially according to technical developments and market requirements, which cannot be wholly predicted in advance. Instead, a virtual terminal model is defined which covers a range of terminal functions, including:

— simple terminals with a limited message repertoire and restricted location database;

— more sophisticated terminals offering full TMC message features and/or a wide range of strategic and tactical location databases;

— terminals which monitor only a single, selected TMC service, and others which employ more sophisticated search strategies of several or many channels;

— terminals which are active before the start of a journey, and others which acquire their TMC data after the journey begins; and

— terminals which provide output via speech synthesis and/or visual displays, and others which interface to more sophisticated on-vehicle route guidance equipment.

4.4 Event-orientated end-user information messages

The ALERT-C protocol defines only event-orientated end-user information messages. Provision is also made for the subsequent definition of other types of message, such as status-orientated route guidance information, or such other applications as may be desired in future.

End-user information messages are those designed primarily to service an in-vehicle terminal, offering information directly to end-users via speech synthesis and/or displays. Terminals can also be used in home and office terminals or public access terminals, to assist in pre-trip journey planning.

Event-orientated messages describe deviations from the normal traffic equilibrium state, and include problems such as congestion, roadworks, adverse weather conditions, accidents, ferry delays or cancellations, etc.

4.5 Strategic and tactical information

ALERT-C distinguishes between strategic information, of value for trip planning and route selection in the medium term, and tactical information likely to be of relevance for immediate local diversions around current traffic problems.

In more detail, broadcast traffic information comprises:

a) immediate "tactical" information, for transmission as soon as possible, with frequent repeats;

b) medium-term "strategic" information, for transmission at intervals, according to available channel capacity;

c) long-term "background" information, for transmission from time to time;

d) forecasts such as weather and expected road conditions, traffic density, coming events; and

e) tourist and other messages, including public transport information, which can be relevant for motorists.

The ALERT-C protocol follows these guidelines, aiming to allow as many as possible of the existing spoken messages to be carried in similar forms using the digital TMC medium.

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4.6 Geographic relevance

ALERT-C utilizes location coding strategies prepared in guidelines developed within the DRIVE Project. These guidelines adopt hierarchical principles of structuring the location database in accordance with EBU Broadcasts for Motorists group functional recommendations for strategic and tactical messages. This is dealt with in ISO 14819-3.

This protocol does not address the internal management of traffic messages by broadcasters in respect to geographical relevance. In the following, it is assumed that broadcasters will arrange to transmit messages with a priority that is appropriate to their geographical relevance. This means that the frequency with which a message is inserted into the message cycle is not only dependent on the event, but is also a function of the location in relation to the broadcasting area.

Extremely urgent messages (X-messages) shall be included by all relevant services that cover the respective area in which the X-message is located.

4.7 Transmitted message priority

Message priorities used by broadcasters adopting RDS-TMC should follow the current approach set out in the EBU Guidelines on Broadcasts for Motorists, revised June 1990. In the context of RDS-TMC, this may be interpreted as the following range of transmitted message priorities:

a) **Extremely urgent information** with highest priority, for immediate broadcast, interrupting existing RDS-TMC message cycles, with very frequent repeats;

b) **Tactical information**, for non-delayed broadcast, with frequent repeats;

c) **Strategic information**, broadcast at intervals according to RDS-TMC channel capacity; and

d) **Background information**, broadcast less frequently, when channel capacity permits.

The ALERT-C protocol does not address the internal management of traffic messages by broadcasters in respect of broadcast message priority. The protocol assumes that broadcasters will arrange to transmit messages at the appropriate level of priority using existing procedures such as those defined by the EBU Guidelines on Broadcasts for Motorists, revised June 1990.

RDS is a single direction broadcast system – and hence a service provider has no means of knowing if any RDS data has been successfully and correctly received by any RDS audio receiver or TMC terminal.

Several factors, including the topology of the broadcasting area, the insertion level of the RDS data signal and the location of a terminal affect its ability to receive RDS information. To optimize the possibility of a terminal receiving RDS data, all RDS groups are transmitted more than once, either immediately or periodically.

For information that is static (or static for lengthy periods), RDS groups are repeated periodically, the period between successive repeated groups may be several minutes.

For data relating to dynamically changing situations (e.g. traffic conditions), the appropriate RDS-TMC groups are repeated in quick succession. Typically, a type 8A RDS-TMC message group is transmitted, followed by between three and eleven non-TMC groups, then an exact repeat of the type 8A RDS-TMC message, another gap of between three and eleven non RDS-TMC message groups, and finally another repeat of the RDS-TMC message group. The transmission of groups according to this so-called 'immediate' repetition pattern was shown in field trials to be optimal for a terminal to acquire RDS data.

In this ALERT-C protocol, a terminal is required to receive at least two identical RDS-TMC groups, through either immediate or periodic repetitions, before it may accept the data as being valid (see 7.3 and 9.4).

The protocol does address the separate question of message urgency within the decoder (see 5.4.5). This aspect of the protocol can be used by terminal manufacturers to determine how a terminal will respond when it receives an RDS-TMC message. Depending on the duration type of the event (see Explanatory

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notes in the Event List), a message is defined as dynamic or longer-lasting. Dynamic messages may be inserted more often in the periodic repetition cycle and shall be updated more often in relation to their duration. Longer-lasting messages may be transmitted less frequently.

4.8 Event List

For the purposes of event-orientated end-user-information messages, ALERT-C protocol utilizes a standard international list of traffic related event descriptions and weather information (see ISO 14819-2).

4.9 Future extensions

Provision is made for future extensions to the protocol:

— using the location numbers reserved in the upper part of the location tables; and

— by means of code combinations left unused in the present coding (e.g. continuity index 000 and 111).

5 Presentation

5.1 General

Clause 5 specifies messages which may be presented to the end-user in accordance with the general requirements set out in the application component. It defines the message structure and content, and its presentation to the end-user.

5.2 TMC virtual language

TMC information is conveyed using a "virtual language" in which the codes broadcast over-air comprise addresses of information stored in databases in the terminals. These databases contain lists of road event situations, including general traffic problems and weather situations, advice, durations and other information, plus lists of locations, including intersections, road numbers and place names.

Several processes are involved in Clause 5:

a) before transmission, information concerning an event is mapped into the TMC virtual language by selection from nested menus of event descriptions and other items, or by a fully-automated traffic monitoring and reporting system;

b) the resulting coded messages are transmitted via RDS, with frequent repetitions;

c) in the terminal, the TMC codes are checked to see if they contain new information or are updates of already received messages. New codes are stored in memory and are subject to message management; and

d) at appropriate times the codes are translated back into messages using look-up tables for presentation to the end-user.

In this virtual language concept, the Event List used at the source and those used in an individual terminal are not necessarily identical. For example, the messages may be input in one language and reproduced in another. Translated event descriptions are maintained by the Traveller Information Services Association (www.tisa.org).

Much of the information conveyed by the codes is implicit and is derived from secondary look-up tables stored in the terminals. These tables are not addressed by explicit fields in the broadcast information, but are derived from the context of the message itself combined with information from the message management and other RDS codes defined in IEC 62106 (all parts).

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