ETSI TS 102 894-2 V1.3.1 (2018-08)

Intelligent Transport Systems (ITS);
Users and applications requirements;
Part 2: Applications and facilities layer common data dictionary

Reference
RTS/ITS-00168

Keywords
application, data, ITS

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Sous-Préfecture de Grasse (06) N° 7803/88

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Intelligent Transport Systems (ITS).

The present document is part 2 of a multi-part deliverable covering the Intelligent Transport Systems (ITS); Users and applications requirements, as identified below:

Part 1: "Facility layer structure, functional requirements and specifications";

Part 2: "Applications and facilities layer common data dictionary".

The specifications of data elements of the facilities layer messages have been tested within various European Projects such as DRIVE C2X, CVIS, SCORE@F, simTD and ETSI Interoperability Test events. Feedbacks from these testing activities have been considered in the present document. The specifications in the present document have also been checked and harmonized with common data dictionary specifications as specified by SAE International.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

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Introduction

ITS applications are enabled by the data exchanges among ITS stations (ITS-S) via wireless or wired communications. A basic set of application [i.1] has been defined by ETSI TC ITS. Accordingly, a set of higher layer messages and communication protocols have been specified in support of this application set.

Even though each message has specific requirements on the data being included and transmitted to other ITS-Ss, ETSI TC ITS has identified a set of data types which are commonly used in multiple ITS applications and facilities layer messages. A common data dictionary is therefore defined for this common set.

For each data type, this common dictionary includes a textual description of the semantic of the data type in question. It also includes the ASN.1 definition of the data type. Therefore, this common data dictionary can be imported by any message when necessary during the encoding and decoding procedure.

1 Scope

The present document defines a repository of a set of data elements and data element sets, denoted as data frames, that are commonly used in the ITS applications and facilities layer messages. Each data element is defined with a set of attributes, enabling the identification of the data element in question in a number of perspectives, e.g. descriptive name, ASN.1 definition, data definition, minimum data granularity requirement, etc.

The present document focuses on the data elements being used by the Cooperative Awareness basic service as outlined in ETSI EN 302 637-2 [i.2] and by the Decentralized Environmental Notification basic service as outlined in ETSI EN 302 637-3 [i.3].

The present document does not specify the syntax and requirements of data elements in the specific context of any message. Such syntax and requirements are specified in the corresponding message standards such as ETSI EN 302 637-2 [i.2] and ETSI EN 302 637-3 [i.3].

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at https://docbox.etsi.org/Reference.

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The following referenced documents are necessary for the application of the present document.

[1] Recommendation ITU-T X.680: "Information technology - Abstract Syntax Notation One (ASN.1): Specification of basic notation".

[2] ISO 8855: "Road vehicles -- Vehicle dynamics and road-holding ability -- Vocabulary".

[3] CEN/TS 16157-3:2011: "Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 3: Situation publication".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ETSI TR 102 638 (V1.1.1): "Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Definitions".

[i.2] ETSI EN 302 637-2: "Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Part 2: Specification of Cooperative Awareness Basic Service".

[i.3] ETSI EN 302 637-3: "Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Part 3: Specifications of Decentralized Environmental Notification Basic Service".

[i.4] European Agreement (Applicable as from 1 January 2011): "Concerning the International Carriage of Dangerous Goods by Road".

NOTE: Available at http://www.unece.org/trans/danger/publi/adr/adr2011/11ContentsE.html.

[i.5] United Nations: "Recommendations on the Transport of Dangerous Goods - Model Regulations", Twelfth revised edition.

NOTE: Available at http://www.unece.org/trans/danger/publi/unrec/12_e.html.

[i.6] ETSI TS 101 539-1 (V1.1.1): "Intelligent Transport Systems (ITS); V2X Applications; Part 1: Road Hazard Signalling (RHS) application requirements specification".

[i.7] ISO 3779 (2011-07): "Road vehicles -- Vehicle identification number (VIN) Content and structure".

[i.8] VDV recommendation 420 (1992): "Technical Requirements for Automatic Vehicle Location / Control Systems - Radio Data Transmission (BON Version) with Supplement 1 and Supplement 2".

[i.9] ISO 1176:1990: "Road vehicles -- Masses -- Vocabulary and codes".

[i.10] ISO 8601:2004: "Data elements and interchange format -- Information interchange -- Representation of dates and times".

[i.11] ETSI TS 101 556-1 (V1.1.1): "Intelligent Transport Systems (ITS); Infrastructure to Vehicle Communication; Electric Vehicle Charging Spot Notification Specification".

[i.12] SAE J2735: "ISO/CEN/SAE JOINT MSG GROUP suggested revisions to the adopted SAE J2735 Dedicated Short Range Communications (DSRC) Message Set Dictionary - MAP and SPAT message".

[i.13] ISO/WD TS 19321: "Intelligent transport systems - Cooperative ITS - Dictionary of in-vehicle information (IVI) data structures".

[i.14] ETSI TS 101 556-3 (V1.1.1): "Intelligent Transport Systems (ITS); Infrastructure to Vehicle Communications; Part 3: Communications system for the planning and reservation of EV energy supply using wireless networks".

[i.15] ETSI TS 101 556-2 (V1.1.1): "Intelligent Transport Systems (ITS); Infrastructure to Vehicle Communication; Part 2: Communication system specification to support application requirements for Tyre Information System (TIS) and Tyre Pressure Gauge (TPG) interoperability".

[i.16] ETSI TS 102 792 (V1.2.1): "Intelligent Transport Systems (ITS); Mitigation techniques to avoid interference between European CEN Dedicated Short Range Communication (CEN DSRC) equipment and Intelligent Transport Systems (ITS) operating in the 5 GHz frequency range".

[i.17] ETSI TS 103 301 (V1.2.1): "Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Facilities layer protocols and communication requirements for infrastructure services".

[i.18] UNECE/TRANS/WP.29/78/Rev.4: "Consolidated Resolution on the Construction of Vehicles (R.E.3)".

[i.19] ETSI TS 102 890-1 (V1.1.1) (05-2017): "Intelligent Transport Systems (ITS); Facilities layer function; Part 1: Services Announcement (SA) specification".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

bounding box: rectangular shape covering all parts of an empty load vehicle projected from top view

NOTE: The empty load vehicle is defined in ISO 1176 [i.9], clause 4.6.

data element: data type that contains one single data

data frame: data type that contains more than one data element in a predefined order

ITS data dictionary: repository of data elements and data frames used in the ITS applications and ITS facilities layer

ITS messages: messages exchanged at ITS facilities layer among ITS stations or messages exchanged at ITS applications layer among ITS stations

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ABS	Anti-lock Braking System
ACC	Adaptive Cruise Control
AEB	Autonomous Emergency Braking
ASN	Abstract Syntax Notation
ASN.1	Abstract Syntax Notation One
CAM	Cooperative Awareness Message
CAN	Controller Area Network
CEN	European Committee for Standardization
CVIS	Cooperative Vehicle-Infrastructure Systems
DE	Data Element
DENM	Decentralized Environmental Notification Message
DF	Data Frame
DR	Dead Reckoning
DSRC	Dedicated Short Range Communication
ESP	Electronic Stability Program
GNSS	Global Navigation Satellite System
ISO	International Standards Organization
ITS	Intelligent Transport Systems
ITS-S	ITS Station
ITU-T	International Telecommunication Union-Telecommunication
IVI	In Vehicle Information
LDM	Local Dynamic Map
MAP	Map Data
OEM	Original Equipment Manufacturer
RSU	Road Side Unit
RTCM	Radio Technical Commission for Maritime services
SAE	Society of Automotive Engineers
SPAT	Signal Phase And Timing
TC	Technical Committee
TIS	Tyre Information System
TPG	Tyre Pressure Gauge
UK	United Kingdom
VDS	Vehicle Descriptor Section
VDV	Verband Deutscher Verkehrsunternehmen
WGS84	World Geodetic System 84
WMI	World Manufacturer Identifier

4 ITS data dictionary structure

4.1 Introduction

The ITS data dictionary is a repository that includes a list of data elements (DE) and data frames (DF) that represent data as well as information necessary for the realization of ITS applications and ITS facilities.

A DE/DF may be used to construct ITS facilities layer or ITS applications layer messages, if needs are identified by the message in question. Examples of ITS facilities layer message are Cooperative Awareness Message (CAM) as specified in ETSI EN 302 637-2 [i.2] and Decentralized Environmental Notification Message (DENM) as specified in ETSI EN 302 637-3 [i.3]. These messages are named as ITS messages in the scope of the present document.

According to the usage purpose, a DE or a DF can be classified into the following categories:

- Message management: the DE/DF is used to support the management of an ITS facilities layer or ITS application layer message and communication protocol, e.g. protocol version.
- Application usage: the DE/DF includes information and data that are useful for the realization of one or multiple ITS applications.

The present document includes DE and DF definitions for the Cooperative Awareness Message (CAM) as given in ETSI EN 302 637-2 [i.2] and for the Decentralized Environmental Notification Message (DENM) as given in ETSI EN 302 637-3 [i.3].

The complete list of DE and DF is provided in the normative annex A of the present document.

Each DE and DF is defined by a set of attributes, enabling the identification of the data in question. These attributes are defined in clause 4.2 and clause 4.3.

4.2 Attributes for DE/DF identification

4.2.1 Descriptive name

This attribute provides a descriptive name of the DE or DF. The descriptive name shall be identical as being used in the messages specifications such as ETSI EN 302 637-2 [i.2] and ETSI EN 302 637-3 [i.3]. It shall also be unique within the common data dictionary. Furthermore, the descriptive name may be used in other ITS applications and facilities layer components, e.g. LDM.

4.2.2 Identifier

This attribute provides a unique identifier of the defined DE or DF. It always starts with the term "DataType" followed by a sequence number as unique identifier. In the present document a three digits sequence number is used.

NOTE: The identifier of a DataType is applicable within the present document, it may also be referenced in other standards.

4.2.3 ASN.1 representation

This attribute provide the ASN.1 representation of the defined DE or DF. The ASN.1 definition shall follow the specifications as defined in Recommendation ITU-T X.680 [1]. The ASN.1 type name shall be identical to the descriptive name.

4.3 Attributes for DE/DF definition

4.3.1 Definition

This attribute provides a textual explication of the defined DE or DF.

4.3.2 Category

This attribute indicates the category that DE or DF in question belongs to. Currently, the following categories are defined:

- **Vehicle information:** the DE or DF describes one or a set of in vehicle data.
- **GeoReference information:** the DE or DF provides geographical description of the data.
- **Road topology information:** the DE or DF describes one or a set of road topology information.
- **Traffic information:** the DE or DF describes one or a set of road traffic information.
- **Infrastructure information:** the DE or DF describes one or a set of ITS infrastructure information.
- **Personal information:** the DE or DF describes one or a set of ITS personal information.
- **Communication information:** the DE or DF describes one or a set of data that are relevant to the ITS application layer or ITS facilities layer communication protocol.
- **Other information:** the DE or DF that does not belong to any of the above categories.

A DE or DF shall belong to at least one of the above categories. One DE or DF may belong to more than one category. It is expected that more categories will be added in the future.

4.3.3 Unit

The applied unit for the data, if necessary.

Annex A (normative): Data type specifications

A.1 DE_AccelerationConfidence

Descriptive Name	AccelerationConfidence
Identifier	DataType_ 1
ASN.1 representation	`AccelerationConfidence ::= INTEGER {pointOneMeterPerSecSquared(1), outOfRange(101), unavailable(102)} (0 .. 102)`
Definition	The absolute accuracy of a reported vehicle acceleration value with a predefined confidence level (e.g. 95 %). The required confidence level is defined by the corresponding standards applying the DE. The value shall be set to: • 1 if the acceleration accuracy is equal to or less than 0,1 m/s^2. • n (n > 1 and n < 100) if the acceleration accuracy is equal to or less than n × 0,1 m/s^2. • 100 if the acceleration accuracy is equal to or less than 10 m/s^2. • 101 if the acceleration accuracy is out of range i.e. greater than 10 m/s^2. • 102 if the data is unavailable. The DE is used in *LateralAcceleration* DF as defined in clause A.115, *LongitudinalAcceleration* DF as defined in clause A.116, or *VerticalAcceleration* DF as defined in clause A.129. NOTE: The fact that an acceleration value is received with confidence set to 'unavailable(102)' can be caused by several reasons, such as: – the sensor cannot deliver the accuracy at the defined confidence level because it is a low-end sensor, – the sensor cannot calculate the accuracy due to lack of variables, or – there has been a vehicle bus (e.g. CAN bus) error. In all 3 cases above, the reported acceleration value may be valid and used by the application. If an acceleration value is received and its confidence is set to 'outOfRange(101)', it means that the value is not valid and therefore cannot be trusted. Such value is not useful for the application.
Unit	0,1 m/s^2
Category	Vehicle information

A.2 DE_AccelerationControl

Descriptive Name	AccelerationControl
Identifier	DataType_ 2

ASN.1 representation	`AccelerationControl ::= BIT STRING {`
	`  brakePedalEngaged (0),`
	`  gasPedalEngaged (1),`
	`  emergencyBrakeEngaged (2),`
	`  collisionWarningEngaged (3),`
	`  accEngaged (4),`
	`  cruiseControlEngaged (5),`
	`  speedLimiterEngaged (6)`
	`} (SIZE(7))`

Definition	Current controlling mechanism for longitudinal movement of the vehicle. The data may be provided via the in-vehicle network. It indicates whether a specific in-vehicle acceleration control system is engaged or not. Currently, this DE includes the information of the vehicle brake pedal, gas pedal, emergency brake system, collision warning system, adaptive cruise control system, cruise control system and speed limiter system. The corresponding bit shall be set to 1 under the following conditions: • brakePedalEngaged(0): Driver is stepping on the brake pedal, • gasPedalEngaged(1): Driver is stepping on the gas pedal, • emergencyBrakeEngaged(2): emergency brake system is engaged, • collisionWarningEngaged(3): collision warning system is engaged, • accEngaged(4): ACC is engaged, • cruiseControlEngaged(5): cruise control is engaged, • speedLimiterEngaged(6): speed limiter is engaged. Otherwise (for example when the corresponding system is not available due to non-equipped system or information is unavailable), the corresponding bit shall be set to 0. NOTE: The system engagement condition is OEM specific and therefore out of scope of the present document.
Unit	N/A
Category	Vehicle information

A.3 DE_AccidentSubCauseCode

Descriptive Name	AccidentSubCauseCode
Identifier	DataType_ 3
ASN.1 representation	`AccidentSubCauseCode ::= INTEGER {unavailable(0), multiVehicleAccident(1), heavyAccident(2), accidentInvolvingLorry(3), accidentInvolvingBus(4), accidentInvolvingHazardousMaterials(5), accidentOnOppositeLane(6), unsecuredAccident(7), assistanceRequested(8)} (0..255)`
Definition	Encoded value of the sub cause codes of the event type "accident" as defined in clause A.10. Sub event cause and value setting rule is defined according to clause 7.1.4 of ETSI EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case the information on the sub cause of the accident is unavailable, • multiVehicleAccident(1): in case more than two vehicles are involved in accident, • heavyAccident(2): in case the airbag of the vehicle involved in the accident is triggered, the accident requires important rescue and/or recovery work, • accidentInvolvingLorry(3): in case the accident involves a lorry, • accidentInvolvingBus(4): in case the accident involves a bus, • accidentInvolvingHazardousMaterials(5): in case the accident involves hazardous material, • accidentOnOppositeLane(6): in case the accident happens on opposite lanes, • unsecuredAccident(7): in case the accident is not secured, • assistanceRequested(8): in case rescue and assistance are requested, • value 9-255: reserved for future usage.
Unit	N/A
Category	Traffic information

A.4 DE_AdverseWeatherCondition-AdhesionSubCauseCode

Descriptive Name	AdverseWeatherCondition-AdhesionSubCauseCode
Identifier	DataType_ 4
ASN.1 representation	`AdverseWeatherCondition-AdhesionSubCauseCode ::= INTEGER {unavailable(0), heavyFrostOnRoad(1), fuelOnRoad(2), mudOnRoad(3), snowOnRoad(4), iceOnRoad(5), blackIceOnRoad(6), oilOnRoad(7), looseChippings(8), instantBlackIce(9), roadsSalted(10)} (0..255)`
Definition	Encoded value of the sub cause codes of the event type "adverseWeatherCondition-Adhesion" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.4 of ETSI EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case information on the cause of the low road adhesion is unavailable, • heavyFrostOnRoad(1): in case the low road adhesion is due to heavy frost on the road, • fuelOnRoad(2): in case the low road adhesion is due to fuel on the road, • mudOnRoad(3): in case the low road adhesion is due to mud on the road, • snowOnRoad(4): in case the low road adhesion is due to snow on the road, • iceOnRoad(5): in case the low road adhesion is due to ice on the road, • blackIceOnRoad(6): in case the low road adhesion is due to black ice on the road, • oilOnRoad(7): in case the low road adhesion is due to oil on the road, • looseChippings(8): in case the low road adhesion is due to loose gravel or stone fragments detached from a road surface or from a hazard, • instantBlackIce(9): in case the low road adhesion is due to instant black ice on the road surface, • roadsSalted(10): when the low road adhesion is due to salted road, • value 11-255: reserved for future usage.
Unit	N/A
Category	Traffic information

A.5 DE_AdverseWeatherCondition-ExtremeWeatherConditionSubCauseCode

Descriptive Name	AdverseWeatherCondition-ExtremeWeatherConditionSubCauseCode
Identifier	DataType_ 5
ASN.1 representation	`AdverseWeatherCondition-ExtremeWeatherConditionSubCauseCode ::= INTEGER {unavailable(0), strongWinds(1), damagingHail(2), hurricane(3), thunderstorm(4), tornado(5), blizzard(6)} (0..255)`
Definition	Encoded value of the sub cause codes of the event type "adverseWeatherCondition-ExtremeWeatherCondition" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.4 of ETSI EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case information on the type of extreme weather condition is unavailable, • strongWinds(1): in case the type of extreme weather condition is strong wind, • damagingHail(2): in case the type of extreme weather condition is damaging hail, • hurricane(3): in case the type of extreme weather condition is hurricane, • thunderstorm(4): in case the type of extreme weather condition is thunderstorm, • tornado(5): in case the type of extreme weather condition is tornado, • blizzard(6): in case the type of extreme weather condition is blizzard, • value 7-255: reserved for future usage.
Unit	N/A
Category	Traffic information

A.6 DE_AdverseWeatherCondition-PrecipitationSubCauseCode

Descriptive Name	AdverseWeatherCondition-PrecipitationSubCauseCode
Identifier	DataType_ 6
ASN.1 representation	`AdverseWeatherCondition-PrecipitationSubCauseCode ::= INTEGER {unavailable(0), heavyRain(1), heavySnowfall(2), softHail(3)} (0..255)`
Definition	Encoded value of the sub cause codes of the event type "adverseWeatherCondition-Precipitation" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.4 of ETSI EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case information on the type of precipitation is unavailable, • heavyRain(1): in case the type of precipitation is heavy rain, • heavySnowfall(2): in case the type of precipitation is heavy snow fall, • softHail(3): in case the type of precipitation is soft hail, • value 4-255: reserved for future usage.
Unit	N/A
Category	Traffic information

A.7 DE_AdverseWeatherCondition-VisibilitySubCauseCode

Descriptive Name	AdverseWeatherCondition-VisibilitySubCauseCode
Identifier	DataType_ 7
ASN.1 representation	`AdverseWeatherCondition-VisibilitySubCauseCode ::= INTEGER {unavailable(0), fog(1), smoke(2), heavySnowfall(3), heavyRain(4), heavyHail(5), lowSunGlare(6), sandstorms(7), swarmsOfInsects(8)} (0..255)`
Definition	Encoded value of the sub cause codes of the event type "adverseWeatherCondition-Visibility" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.4 of ETSI EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case information on the cause of low visibility is unavailable, • fog(1): in case the cause of low visibility is fog, • smoke(2): in case the cause of low visibility is smoke, • heavySnowfall(3): in case the cause of low visibility is heavy snow fall, • heavyRain(4): in case the cause of low visibility is heavy rain, • heavyHail(5): in case the cause of low visibility is heavy hail, • lowSunGlare(6): in case the cause of low visibility is sun glare, • sandstorms(7): in case the cause of low visibility is sand storm, • swarmsOfInsects(8): in case the cause of low visibility is swarm of insects, • value 9-255: reserved for future usage.
Unit	N/A
Category	Traffic information

A.8 DE_AltitudeConfidence

Descriptive Name AltitudeConfidence

Identifier DataType_ 8

ASN.1 representation

```
AltitudeConfidence ::= ENUMERATED {
    alt-000-01 (0),
    alt-000-02 (1),
    alt-000-05 (2),
    alt-000-10 (3),
    alt-000-20 (4),
    alt-000-50 (5),
    alt-001-00 (6),
    alt-002-00 (7),
    alt-005-00 (8),
    alt-010-00 (9),
    alt-020-00 (10),
    alt-050-00 (11),
    alt-100-00 (12),
    alt-200-00 (13),
    outOfRange (14),
    unavailable (15)
}
```

Definition

Absolute accuracy of a reported altitude value of a geographical point for a predefined confidence level (e.g. 95 %). The required confidence level is defined by the corresponding standards applying the usage of this DE.
The value shall be set to:

- 0 if the altitude accuracy is equal to or less than 0,01 metre
- 1 if the altitude accuracy is equal to or less than 0,02 metre
- 2 if the altitude accuracy is equal to or less than 0,05 metre
- 3 if the altitude accuracy is equal to or less than 0,1 metre
- 4 if the altitude accuracy is equal to or less than 0,2 metre
- 5 if the altitude accuracy is equal to or less than 0,5 metre
- 6 if the altitude accuracy is equal to or less than 1 metre
- 7 if the altitude accuracy is equal to or less than 2 metres
- 8 if the altitude accuracy is equal to or less than 5 metres
- 9 if the altitude accuracy is equal to or less than 10 metres
- 10 if the altitude accuracy is equal to or less than 20 metres
- 11 if the altitude accuracy is equal to or less than 50 metres
- 12 if the altitude accuracy is equal to or less than 100 metres
- 13 if the altitude accuracy is equal to or less than 200 metres
- 14 if the altitude accuracy is out of range, i.e. greater than 200 metres
- 15 if the altitude accuracy information is unavailable

The DE is used in *Altitude* DF as defined in clause A.103.

NOTE: The fact that an altitude value is received with confidence set to 'unavailable(15)' can be caused by several reasons, such as:
- the sensor cannot deliver the accuracy at the defined confidence level because it is a low-end sensor,
- the sensor cannot calculate the accuracy due to lack of variables, or
- there has been a vehicle bus (e.g. CAN bus) error.

In all 3 cases above, the reported altitude value may be valid and used by the application.

If an altitude value is received and its confidence is set to 'outOfRange(14)', it means that the reported altitude value is not valid and therefore cannot be trusted. Such value is not useful for the application.

Unit N/A

Category GeoReference information

A.9 DE_AltitudeValue

Descriptive Name	AltitudeValue
Identifier	DataType_ 9
ASN.1 representation	`AltitudeValue ::= INTEGER {referenceEllipsoidSurface(0), oneCentimeter(1), unavailable(800001) } (-100000..800001)`
Definition	Altitude in a WGS84 co-ordinate system. When the information is not available, the DE shall be set to 800 001. For altitude equal or greater than 8 000 m, the DE shall be set to 800 000. For altitude equal or less than -1 000 m, the DE shall be set to -100 000. The DE is used in *Altitude* DF as defined in clause A.103.
Unit	0,01 metre
Category	GeoReference information

A.10 DE_CauseCodeType

Descriptive Name	CauseCodeType
Identifier	DataType_ 10

ASN.1 representation	`CauseCodeType ::= INTEGER {`
	`  reserved (0),`
	`  trafficCondition (1),`
	`  accident (2),`
	`  roadworks (3),`
	`  impassability (5),`
	`  adverseWeatherCondition-Adhesion (6),`
	`  aquaplannning (7),`
	`  hazardousLocation-SurfaceCondition (9),`
	`  hazardousLocation-ObstacleOnTheRoad (10),`
	`  hazardousLocation-AnimalOnTheRoad (11),`
	`  humanPresenceOnTheRoad (12),`
	`  wrongWayDriving (14),`
	`  rescueAndRecoveryWorkInProgress (15),`
	`  adverseWeatherCondition-ExtremeWeatherCondition (17),`
	`  adverseWeatherCondition-Visibility (18),`
	`  adverseWeatherCondition-Precipitation (19),`
	`  slowVehicle (26),`
	`  dangerousEndOfQueue (27),`
	`  vehicleBreakdown (91),`
	`  postCrash (92),`
	`  humanProblem (93),`
	`  stationaryVehicle (94),`
	`  emergencyVehicleApproaching (95),`
	`  hazardousLocation-DangerousCurve (96),`
	`  collisionRisk (97),`
	`  signalViolation (98),`
	`  dangerousSituation (99)`
	`} (0..255)`

Definition	Value of the direct cause code of a detected event as defined in ETSI EN 302 637-3 [i.3]. The value is assigned according to the clause 7.1.4 of ETSI EN 302 637-3 [i.3]. The cause codes are described as following: • reserved (0): the value is reserved for future use, • trafficCondition (1): the type of event is an abnormal traffic condition, • accident (2): the type of event is a road accident, • roadworks (3): the type of event is roadwork, • value 4: reserved for future usage, • impassability (5): the type of event is unmanaged road blocking, referring to any blocking of a road, partial or total, which has not been adequately secured and signposted, • adverseWeatherCondition-Adhesion (6): the type of event is low adhesion, • aquaplaning (7): danger of aquaplaning on the road, • value 8: reserved for future usage, • hazardousLocation-SurfaceCondition (9): the type of event is abnormal road surface condition, • hazardousLocation-ObstacleOnTheRoad (10): the type of event is obstacle on the road, • hazardousLocation-AnimalOnTheRoad (11): the type of event is animal on the road, • humanPresenceOnTheRoad (12): the type of event is human presence on the road, • value 13: reserved for future usage, • wrongWayDriving (14): the type of the event is vehicle driving in wrong way, • rescueAndRecoveryWorkInProgress (15): the type of event is rescue and recovery work for accident or for a road hazard in progress, • value 16: reserved for future usage, • adverseWeatherCondition-ExtremeWeatherCondition (17): the type of event is extreme weather condition, • adverseWeatherCondition-Visibility (18): the type of event is low visibility, • adverseWeatherCondition-Precipitation (19): the type of event is precipitation, • value 20-25: reserved for future usage, • slowVehicle (26): the type of event is slow vehicle driving on the road, • dangerousEndOfQueue (27): the type of event is dangerous end of vehicle queue, • Value 28-90: reserved for future usage, • vehicleBreakdown (91): the type of event is break down vehicle on the road, • postCrash (92): the type of event is a detected crash, • humanProblem (93): the type of event is human health problem in vehicles involved in traffic, • stationaryVehicle (94): the type of event is stationary vehicle, • emergencyVehicleApproaching (95): the type of event is approaching vehicle operating emergency mission, • hazardousLocation-DangerousCurve (96): the type of event is dangerous curve, • collisionRisk (97): the type of event is a collision risk, • signalViolation (98): the type of event is signal violation, • dangerousSituation (99): the type of event is dangerous situation in which autonomous safety system in vehicle is activated, • value 100-255: reserved for future usage.
Unit	N/A
Category	Traffic information

A.11 DE_CenDsrcTollingZoneID

Descriptive Name	CenDsrcTollingZoneID
Identifier	DataType_11
ASN.1 representation	`CenDsrcTollingZoneID ::= ProtectedZoneID`
Definition	ID of a CEN DSRC tolling zone. It shall be presented as defined in clause A.56 *ProtectedZoneID.* This DE is used in *CenDsrcTollingZone* DF as defined in clause A.105.
Unit	N/A
Category	Infrastructure information, Communication information

A.12 DE_CollisionRiskSubCauseCode

Descriptive Name	CollisionRiskSubCauseCode
Identifier	DataType_ 12
ASN.1 representation	`CollisionRiskSubCauseCode ::= INTEGER {unavailable(0), longitudinalCollisionRisk(1), crossingCollisionRisk(2), lateralCollisionRisk(3), vulnerableRoadUser(4)} (0..255)`
Definition	Encoded value of the sub cause codes of the event type "collisionRisk" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.4 of ETSI EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case information on the type of collision risk is unavailable, • longitudinalCollisionRisk(1): in case the type of detected collision risk is longitudinal collision risk, e.g. forward collision or face to face collision, • crossingCollisionRisk(2): in case the type of detected collision risk is crossing collision risk, • lateralCollisionRisk(3): in case the type of detected collision risk is lateral collision risk, • vulnerableRoadUser(4): in case the type of detected collision risk involves vulnerable road users e.g. pedestrians or bicycles, • value 5-255: reserved for future usage.
Unit	N/A
Category	Traffic information

A.13 DE_CurvatureCalculationMode

Descriptive Name	CurvatureCalculationMode
Identifier	DataType_ 13
ASN.1 representation	`CurvatureCalculationMode ::= ENUMERATED {yawRateUsed(0), yawRateNotUsed(1), unavailable(2),... }`
Definition	It describes whether the yaw rate is used to calculate the curvature for a reported curvature value. When the information of curvature calculation mode is unknown, the value shall be set to 2.
Unit	N/A
Category	Vehicle Information

A.14 DE_CurvatureConfidence

Descriptive Name	CurvatureConfidence
Identifier	DataType_ 14

ASN.1 representation	`CurvatureConfidence ::= ENUMERATED {`
	`  onePerMeter-0-00002 (0),`
	`  onePerMeter-0-0001 (1),`
	`  onePerMeter-0-0005 (2),`
	`  onePerMeter-0-002 (3),`
	`  onePerMeter-0-01 (4),`
	`  onePerMeter-0-1 (5),`
	`  outOfRange (6),`
	`  unavailable (7)`
	`}`

Definition	It describes the absolute accuracy range of a reported curvature value for a predefined confidence level. The required confidence level is defined by the corresponding standards applying the DE. The value shall be set to: • 0 if the accuracy is less than or equal to 0,00002 m^{-1} • 1 if the accuracy is less than or equal to 0,0001 m^{-1} • 2 if the accuracy is less than or equal to 0,0005 m^{-1} • 3 if the accuracy is less than or equal to 0,002 m^{-1} • 4 if the accuracy is less than or equal to 0,01 m^{-1} • 5 if the accuracy is less than or equal to 0,1 m^{-1} • 6 if the accuracy is out of range, i.e. greater than 0,1 m^{-1} • 7 if the information is not available The DE is used in *Curvature* DF as defined in clause A.107. NOTE: The fact that a curvature value is received with confidence set to 'unavailable(7)' can be caused by several reasons, such as: – the sensor cannot deliver the accuracy at the defined confidence level because it is a low-end sensor, – the sensor cannot calculate the accuracy due to lack of variables, or – there has been a vehicle bus (e.g. CAN bus) error. In all 3 cases above, the reported curvature value may be valid and used by the application. If a curvature value is received and its confidence is set to 'outOfRange(6)', it means that the reported curvature value is not valid and therefore cannot be trusted. Such value is not useful for the application.
Unit	N/A
Category	Vehicle Information

A.15 DE_CurvatureValue

Descriptive Name	CurvatureValue
Identifier	DataType_ 15
ASN.1 representation	`CurvatureValue ::= INTEGER {straight(0), unavailable(1023)} (-1023..1023)`
Definition	It describes vehicle turning curve with the following information: Value=1/Radius*10000 wherein radius is the vehicle turning curve radius. Positive values indicate a turning curve to the left hand side of the driver. It corresponds to the vehicle coordinate system as defined in ISO 8855 [2]. The value shall be set to 0 when the vehicle is moving straight. The value shall be set to 1023, if the information is not available. For calculated values smaller than -1023, the DE shall be set to -1023. For calculated values bigger than 1022, the DE shall be set to 1022. The DE is used in *Curvature* DF as defined in clause A.107. NOTE: The present DE is limited to vehicle types as defined in ISO 8855 [2].
Unit	1 over 10 000 metres
Category	Vehicle Information

A.16 DE_DangerousEndOfQueueSubCauseCode

Descriptive Name	DangerousEndOfQueueSubCauseCode
Identifier	DataType_ 16
ASN.1 representation	`DangerousEndOfQueueSubCauseCode ::= INTEGER {unavailable(0), suddenEndOfQueue(1), queueOverHill(2), queueAroundBend(3), queueInTunnel(4)} (0..255)`
Definition	Encoded value of the sub cause codes of the event type "dangerousEndOfQueue" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.4 of ETSI ETSI EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case information on the type of dangerous queue is unavailable, • suddenEndOfQueue(1): in case a sudden end of queue is detected, e.g. due to accident or obstacle, • queueOverHill(2): in case the dangerous end of queue is detected on the road hill, • queueAroundBend(3): in case the dangerous end of queue is detected around the road bend, • queueInTunnel(4): in case queue is detected in tunnel, • value 5-255: reserved for future usage.
Unit	N/A
Category	Traffic information

A.17 DE_DangerousGoodsBasic

Descriptive Name	DangerousGoodsBasic
Identifier	DataType_ 17

ASN.1 representation	`DangerousGoodsBasic::= ENUMERATED {`
	`explosives1(0),`
	`explosives2(1),`
	`explosives3(2),`
	`explosives4(3),`
	`explosives5(4),`
	`explosives6(5),`
	`flammableGases(6),`
	`nonFlammableGases(7),`
	`toxicGases(8),`
	`flammableLiquids(9),`
	`flammableSolids(10),`
	`substancesLiableToSpontaneousCombustion(11),`
	`substancesEmittingFlammableGasesUponContactWithWater(12),`
	`oxidizingSubstances(13),`
	`organicPeroxides(14),`
	`toxicSubstances(15),`
	`infectiousSubstances(16),`
	`radioactiveMaterial(17),`
	`corrosiveSubstances(18),`
	`miscellaneousDangerousSubstances(19)`
	`}`

Definition	This DE indicates the type of the dangerous goods being carried by a heavy vehicle. The value is assigned according to "class" and "division" definitions of dangerous goods as specified in part II, chapter 2.1.1.1 of European Agreement concerning the International Carriage of Dangerous Goods by Road [i.4]. The DE is used in *DangerousGoodsExtended* DF as defined in clause A.108.
Unit	N/A
Category	Vehicle information

A.18 DE_DangerousSituationSubCauseCode

Descriptive Name	DangerousSituationSubCauseCode
Identifier	DataType_ 18
ASN.1 representation	`DangerousSituationSubCauseCode ::= INTEGER {unavailable(0), emergencyElectronicBrakeEngaged(1), preCrashSystemEngaged(2), espEngaged(3), absEngaged(4), aebEngaged(5), brakeWarningEngaged(6), collisionRiskWarningEngaged(7)} (0..255)`
Definition	Encoded value of the sub cause codes of the event type "dangerousSituation" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.4 of ETSI ETSI EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case information on the type of dangerous situation is unavailable, • emergencyElectronicBrakeEngaged(1): in case emergency electronic brake is engaged, • preCrashSystemEngaged(2): in case pre-crash system is engaged, • espEngaged(3): in case Electronic Stability Program (ESP) system is engaged, • absEngaged(4): in case Anti-lock braking system (ABS) is engaged, • aebEngaged(5): in case Autonomous Emergency Braking (AEB) system is engaged, • brakeWarningEngaged(6): in case brake warning is engaged, • collisionRiskWarningEngaged(7): in case collision risk warning is engaged, • value 8-255: reserved for future usage.
Unit	N/A
Category	Traffic information

A.19 DE_DeltaAltitude

Descriptive Name	DeltaAltitude
Identifier	DataType_ 19
ASN.1 representation	`DeltaAltitude ::= INTEGER {oneCentimeterUp (1), oneCentimeterDown (-1), unavailable(12800)} (-12700..12800)`
Definition	It defines an offset altitude with regards to a referred altitude value. It may be used to describe a geographical point with regards to a specific reference geographical position. Positive values are used for providing altitude offset above the reference position. For values equal or greater than 127,99 metres, the value shall be 12 799. Negative values are used for providing altitude offset below the reference position. When the information is unavailable, the value shall be set to 12 800. The DE is used in *DeltaReferencePosition* DF as defined in clause A.109.
Unit	0,01 metre
Category	GeoReference information

A.20 DE_DeltaLatitude

Descriptive Name	DeltaLatitude
Identifier	DataType_ 20
ASN.1 representation	`DeltaLatitude ::= INTEGER {oneMicrodegreeNorth (10), oneMicrodegreeSouth (-10), unavailable(131072)} (-131071..131072)`
Definition	It defines offset latitude with regards to a referred latitude value. It may be used to describe a geographical point with regards to a specific reference geographical position. Positive values are used for providing offset towards the north from the reference position. Negative values are used for providing offset towards the south from the reference position. When the information is unavailable, the value shall be set to 131 072. The DE is used in *DeltaReferencePosition* DF as defined in clause A.109.
Unit	0,1 microdegree
Category	GeoReference information

A.21 DE_DeltaLongitude

Descriptive Name	DeltaLongitude
Identifier	DataType_ 21
ASN.1 representation	`DeltaLongitude ::= INTEGER {oneMicrodegreeEast (10), oneMicrodegreeWest (-10), unavailable(131072)} (-131071..131072)`
Definition	It defines an offset longitude with regards to a referred longitude value. It may be used to describe a geographical point with regards to a specific reference geographical position. Positive values are used for providing offset towards the east from the reference position. Negative values are used for providing offset towards the west from the reference position. When the information is unavailable, the value shall be set to 131 072. The DE is used in *DeltaReferencePosition* DF as defined in clause A.109.
Unit	0,1 microdegree
Category	GeoReference information

A.22 DE_DriveDirection

Descriptive Name	DriveDirection
Identifier	DataType_ 22
ASN.1 representation	`DriveDirection ::= ENUMERATED {forward (0), backward (1), unavailable (2)}`
Definition	It denotes whether a vehicle is driving forward or backward. When the information is unavailable, the value shall be set to 2.
Unit	N/A
Category	Vehicle information

A.23 DE_DrivingLaneStatus

Descriptive Name	DrivingLaneStatus
Identifier	DataType_ 23
ASN.1 representation	`DrivingLaneStatus ::= BIT STRING (SIZE (1..13))`
Definition	DE that indicates whether a driving lane is open to traffic. A lane is counted from inside border of the road excluding the hardshoulder. The size of the bit string shall correspond to the total number of the driving lanes in the carriageway. The numbering is matched to *LanePosition* DE as defined in clause A.40. The bit 0 is used to indicate the innermostLane, bit 1 is used to indicate the second lane from inside border. NOTE: Hard shoulder status is not provided by this DE but in *HardShoulderStatus* as defined in clause A.29. If a lane is closed to traffic, the corresponding bit shall be set to 1. Otherwise, it shall be set to 0. The DE is used in *ClosedLanes* DF as defined in clause A.106.
Unit	N/A
Category	Traffic information

A.24 DE_EmbarkationStatus

Descriptive Name	EmbarkationStatus
Identifier	DataType_ 24
ASN.1 representation	`EmbarkationStatus ::= BOOLEAN`
Definition	It indicates whether a vehicle (e.g. public transport vehicle, truck) is under the embarkation process. If it is the case, the value shall be set to TRUE.
Unit	N/A
Category	Vehicle information

A.25 DE_EmergencyPriority

Descriptive Name	EmergencyPriority
Identifier	DataType_ 25
ASN.1 representation	`EmergencyPriority ::= BIT STRING {requestForRightOfWay(0), requestForFreeCrossingAtATrafficLight(1)} (SIZE(2))`
Definition	It indicates the right of priority requested by an operating emergency vehicle. The right-of-priority bit shall be set to 1 if the corresponding right is requested.
Unit	N/A
Category	Traffic information

A.26 DE_EmergencyVehicleApproachingSubCauseCode

Descriptive Name	EmergencyVehicleApproachingSubCauseCode
Identifier	DataType_ 26
ASN.1 representation	`EmergencyVehicleApproachingSubCauseCode ::= INTEGER {unavailable(0), emergencyVehicleApproaching(1), prioritizedVehicleApproaching(2)} (0..255)`
Definition	Encoded value of the sub cause codes of the event type "emergencyVehicleApproaching" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.4 of ETSI EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on the emergency vehicle approaching event is unavailable, • emergencyVehicleApproaching(1): in case an operating emergency vehicle is approaching, • prioritizedVehicleApproaching(2): in case a prioritized vehicle (e.g. bus) is approaching, • value 3-255: reserved for future usage.
Unit	N/A
Category	Traffic information

A.27 DE_EnergyStorageType

Descriptive Name	EnergyStorageType
Identifier	DataType_ 27
ASN.1 representation	`EnergyStorageType::= BIT STRING {hydrogenStorage(0), electricEnergyStorage(1), liquidPropaneGas(2), compressedNaturalGas(3), diesel(4), gasoline(5), ammonia(6)} (SIZE(7))`
Definition	Type of energy being used and stored in vehicle. If a storage type is used by the vehicle, the corresponding bit shall be set to 1. Otherwise, the corresponding bit shall be set to 0.
Unit	N/A
Category	Vehicle information

A.28 DE_ExteriorLights

Descriptive Name	ExteriorLights
Identifier	DataType_ 28

ASN.1 representation	`ExteriorLights ::= BIT STRING {`
	`  lowBeamHeadlightsOn (0),`
	`  highBeamHeadlightsOn (1),`
	`  leftTurnSignalOn (2),`
	`  rightTurnSignalOn (3),`
	`  daytimeRunningLightsOn (4),`
	`  reverseLightOn (5),`
	`  fogLightOn (6),`
	`  parkingLightsOn (7)`
	`} (SIZE(8))`

Definition	This DE describes the status of the exterior light switches of a vehicle. The value of each bit indicates the state of the switch, which commands the corresponding light. The bit corresponding to a specific light is set to 1, when the corresponding switch is turned on, either manually by the driver or automatically by a vehicle system. The bit value does not indicate if the corresponding lamps are alight or not. If a vehicle is not equipped with a certain light or if the light switch status information is not available, the corresponding bit shall be set to 0. The fogLightOn only indicates the status of the tail fog lamp switch. As the bit value indicates only the state of the switch, the turn signal and hazard signal bit values shall not alternate with the blinking interval. For hazard indicator, the leftTurnSignalOn (2) and rightTurnSignalOn (3) shall be set to 1.
Unit	N/A
Category	Vehicle information

A.29 DE_HardShoulderStatus

Descriptive Name	HardShoulderStatus
Identifier	DataType_ 29
ASN.1 representation	`HardShoulderStatus ::= ENUMERATED {availableForStopping(0), closed(1), availableForDriving(2)}`
Definition	This DE indicates the current status of a hard shoulder lane whether it is available for special usage (e.g. for stopping or for driving) or closed for all vehicles. The DE is used in *ClosedLanes* DF as defined in clause A.106.
Unit	N/A
Category	Traffic information

A.30 DE_HazardousLocation-AnimalOnTheRoadSubCauseCode

Descriptive Name	HazardousLocation-AnimalOnTheRoadSubCauseCode
Identifier	DataType_ 30
ASN.1 representation	`HazardousLocation-AnimalOnTheRoadSubCauseCode ::= INTEGER {unavailable(0), wildAnimals(1), herdOfAnimals(2), smallAnimals(3), largeAnimals(4)} (0..255)`
Definition	Encoded value of the sub cause codes of the event type "hazardousLocation-AnimalOnTheRoad" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.4 of ETSI EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on the animal on the road event is unavailable, • wildAnimals(1): in case wild animals are detected on the road, • herdOfAnimals(2): in case herd of animals are detected on the road, • smallAnimals(3): in case small size animal is detected on the road, • largeAnimals(4): in case large size animal is detected on the road, • value 5-255: reserved for future usage.
Unit	N/A
Category	Traffic information

A.31 DE_HazardousLocation-DangerousCurveSubCauseCode

Descriptive Name	HazardousLocation-DangerousCurveSubCauseCode
Identifier	DataType_ 31
ASN.1 representation	`HazardousLocation-DangerousCurveSubCauseCode ::= INTEGER {unavailable(0), dangerousLeftTurnCurve(1), dangerousRightTurnCurve(2), multipleCurvesStartingWithUnknownTurningDirection(3), multipleCurvesStartingWithLeftTurn(4), multipleCurvesStartingWithRightTurn(5)} (0..255)`
Definition	Encoded value of the sub cause codes of the event type "hazardousLocation-DangerousCurve" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.4 of ETSI EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on the dangerous curve is unavailable, • dangerousLeftTurnCurve(1): in case the dangerous curve is a left turn curve, • dangerousRightTurnCurve(2): in case the dangerous curve is a right turn curve, • multipleCurvesStartingWithUnknownTurningDirection(3): in case of multiple curves for which the starting curve turning direction is not known, • multipleCurvesStartingWithLeftTurn(4): in case of multiple curves starting with a left turn curve, • multipleCurvesStartingWithRightTurn(5): in case of multiple curves stating with a right turn curve, • value 6-255: reserved for future usage. The definition of whether a curve is dangerous may vary according to region and according to vehicle types/mass and vehicle speed driving on the curve. This definition is out of scope of the present document.
Unit	N/A
Category	Traffic information

A.32 DE_HazardousLocation-ObstacleOnTheRoadSubCauseCode

Descriptive Name	HazardousLocation-ObstacleOnTheRoadSubCauseCode
Identifier	DataType_ 32
ASN.1 representation	`HazardousLocation-ObstacleOnTheRoadSubCauseCode ::= INTEGER {unavailable(0), shedLoad(1), partsOfVehicles(2), partsOfTyres(3), bigObjects(4), fallenTrees(5), hubCaps(6), waitingVehicles(7)} (0..255)`
Definition	Encoded value of the sub cause codes of the event type "hazardousLocation-ObstacleOnTheRoad" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.4 of ETSI EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on the detected obstacle is unavailable, • shedLoad(1): in case detected obstacle is large amount of obstacles (shedload), • partsOfVehicles(2): in case detected obstacles are parts of vehicles, • partsOfTyres(3): in case the detected obstacles are parts of tyres, • bigObjects(4): in case the detected obstacles are big objects, • fallenTrees(5): in case the detected obstacles are fallen trees, • hubCaps(6): in case the detected obstacles are hub caps, • waitingVehicles(7): in case the detected obstacles are waiting vehicles, • value 8-255: reserved for future usage.
Unit	N/A
Category	Traffic information

A.33 DE_HazardousLocation-SurfaceConditionSubCauseCode

Descriptive Name	HazardousLocation-SurfaceConditionSubCauseCode
Identifier	DataType_ 33
ASN.1 representation	`HazardousLocation-SurfaceConditionSubCauseCode ::= INTEGER {unavailable(0), rockfalls(1), earthquakeDamage(2), sewerCollapse(3), subsidence(4), snowDrifts(5), stormDamage(6), burstPipe(7), volcanoEruption(8), fallingIce(9)} (0..255)`
Definition	Encoded value of the sub cause codes of the event type "hazardousLocation-SurfaceCondition" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.4 of ETSI EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on the road surface condition is unavailable, • rockfalls(1): in case rock falls are detected on the road surface, • earthquakeDamage(2): in case the road surface is damaged by earthquake, • sewerCollapse(3): in case of sewer collapse on the road surface, • subsidence(4): in case road surface is damaged by subsidence, • snowDrifts(5): in case road surface is damaged due to snow drift, • stormDamage(6): in case road surface is damaged by strong storm, • burstPipe(7): in case road surface is damaged due to pipe burst, • volcanoEruption(8): in case road surface is damaged due to volcano eruption, • fallingIce(9): in case road surface damage is due to falling ice, • value 10-255: reserved for future usage.
Unit	N/A
Category	Traffic information

A.34 DE_HeadingConfidence

Descriptive Name	HeadingConfidence
Identifier	DataType_ 34
ASN.1 representation	`HeadingConfidence ::= INTEGER {equalOrWithinZeroPointOneDegree (1), equalOrWithinOneDegree (10), outOfRange(126), unavailable(127)} (1..127)`
Definition	The absolute accuracy of a reported heading value for a predefined confidence level (e.g. 95 %). The required confidence level is defined by the corresponding standards applying the DE. The value shall be set to: • 1 if the heading accuracy is equal to or less than 0,1 degree, • n (n > 1 and n < 125) if the heading accuracy is equal to or less than n × 0,1 degree, • 125 if the heading accuracy is equal to or less than 12,5 degrees, • 126 if the heading accuracy is out of range, i.e. greater than 12,5 degrees, • 127 if the heading accuracy information is not available. The DE is used in *Heading* DF as defined in clause A.112. NOTE: The fact that a value is received with confidence set to 'unavailable(127)' can be caused by several reasons, such as: – the sensor cannot deliver the accuracy at the defined confidence level because it is a low-end sensor, – the sensor cannot calculate the accuracy due to lack of variables, or – there has been a vehicle bus (e.g. CAN bus) error. In all 3 cases above, the reported heading value may be valid and used by the application. If a heading value is received and its confidence is set to 'outOfRange(126)', it means that the reported heading value is not valid and therefore cannot be trusted. Such value is not useful for the application.
Unit	0,1 degree
Category	GeoReference information, vehicle information, road topology information

A.35 DE_HeadingValue

Descriptive Name	HeadingValue
Identifier	DataType_ 35
ASN.1 representation	`HeadingValue ::= INTEGER {wgs84North(0), wgs84East(900), wgs84South(1800), wgs84West(2700), unavailable(3601)} (0..3601)`
Definition	Orientation of a heading with regards to the WGS84 north. When the information is not available, the DE shall be set to 3 601. The DE is used in *Heading* DF as defined in clause A.112, and *PosConfidenceEllipse* DF as defined in clause A.119.
Unit	0,1 degree
Category	GeoReference information, vehicle information, road topology information

A.36 DE_HeightLonCarr

Descriptive Name	HeightLonCarr
Identifier	DataType_ 36
ASN.1 representation	`HeightLonCarr ::= INTEGER {oneCentimeter(1), unavailable(100)} (1..100)`
Definition	Height of left or right longitude carrier of vehicle from base to top (left or right carrier seen from vehicle rear to front). For values equal to or greater than 99 cm, the DE shall be set to 99. If the value is unavailable, the DE shall be set to 100.
Unit	1 centimetre
Category	Vehicle information

A.37 DE_HumanPresenceOnTheRoadSubCauseCode

Descriptive Name	HumanPresenceOnTheRoadSubCauseCode
Identifier	DataType_ 37
ASN.1 representation	`HumanPresenceOnTheRoadSubCauseCode ::= INTEGER {unavailable(0), childrenOnRoadway(1), cyclistOnRoadway(2), motorcyclistOnRoadway(3)} (0..255)`
Definition	Encoded value of the sub cause codes of the event type "humanPresenceOnTheRoad" as defined in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.4 of ETSI EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on human presence on the road is unavailable, • childrenOnRoadway(1): in case children are detected on the road event, • cyclistOnRoadway(2): in case cyclist presence is detected on the road, • motorcyclistOnRoadway(3): in case motorcyclist presence is detected on the road, • value 46-255: reserved for future usage.
Unit	N/A
Category	Traffic information

A.38 DE_HumanProblemSubCauseCode

Descriptive Name	HumanProblemSubCauseCode
Identifier	DataType_ 38
ASN.1 representation	`HumanProblemSubCauseCode ::= INTEGER { unavailable(0), glycemiaProblem(1), heartProblem(2)} (0..255)`
Definition	Encoded value of the sub cause codes of the event type "humanProblem" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.4 of ETSI EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on human health problem is unavailable, • glycemiaProblem(1): in case human problem is due to glycaemia problem, • heartProblem(2): in case human problem is due to heart problem, • value 3-255: reserved for future usage.
Unit	N/A
Category	Traffic information

A.39 DE_InformationQuality

Descriptive Name	InformationQuality
Identifier	DataType_ 39
ASN.1 representation	`InformationQuality ::= INTEGER {unavailable(0), lowest(1), highest(7)} (0..7)`
Definition	Quality level of provided information. The DE is used in *EventPoint* DF as defined in clause A.111. NOTE: Definition of quality level is out of scope of the present document.
Unit	N/A
Category	Other information

A.40 DE_LanePosition

Descriptive Name	LanePosition
Identifier	DataType_ 40
ASN.1 representation	`LanePosition ::= INTEGER {offTheRoad(-1), innerHardShoulder(0), innermostDrivingLane(1), secondLaneFromInside(2), outterHardShoulder(14) } (-1..14)`
Definition	This DE indicates the transversal position information on the road in resolution of lanes, counted from the inside border of the road for a given traffic direction. For example, the innermostDrivingLane corresponds to the left most lane of the carriageway in a country with right-land traffic, and to the right most lane of the carriageway in a left-land traffic (e.g. in UK). The value -1 denotes that the referenced position is outside the road.
Unit	N/A
Category	GeoReference information, road topology information

A.41 DE_Latitude

Descriptive Name	Latitude
Identifier	DataType_ 41
ASN.1 representation	`Latitude ::= INTEGER {oneMicrodegreeNorth (10), oneMicrodegreeSouth (-10), unavailable(900000001) } (-900000000..900000001)`
Definition	Absolute geographical latitude in a WGS84 coordinate system, providing a range of 90 degrees in north or in south hemisphere. Positive values are used for latitude in north of the Equator, negative values are used for latitude in south of the Equator. When the information is unavailable, the value shall be set to 900 000 001. The DE is used in *CenDsrcTollingZone* DF as defined in clause A.105, *ProtectedCommunicationZone* DF as defined in clause A.121 and *ReferencePosition* DF as defined in clause A.124.
Unit	0,1 microdegree
Category	GeoReference information

A.42 DE_LateralAccelerationValue

Descriptive Name	LateralAccelerationValue
Identifier	DataType_ 42
ASN.1 representation	`LateralAccelerationValue ::= INTEGER {pointOneMeterPerSecSquaredToRight(-1), pointOneMeterPerSecSquaredToLeft(1), unavailable(161)} (-160 .. 161)`
Definition	Vehicle acceleration at lateral direction in the centre of the mass of the empty vehicle. It corresponds to the vehicle coordinate system as specified in ISO 8855 [2]. Negative value indicates that the vehicle is accelerating towards the right side with regards to the vehicle orientation. For values equal to or greater than 16 m/s^2 towards the right, the value shall be set to -160. Positive values indicate the acceleration to the left hand side with regards to the vehicle orientation. For values equal to or greater than 16 m/s^2 towards the left, the value shall be set to 160. When the information is not available, the value shall be set to 161. The DE is used in *LateralAcceleration* DF as defined in clause A.115. NOTE: The empty load vehicle is defined in ISO 1176 [i.9], clause 4.6.
Unit	0,1 m/s^2
Category	Vehicle information

A.43 DE_LightBarSirenInUse

Descriptive Name	LightBarSirenInUse
Identifier	DataType_ 43
ASN.1 representation	`LightBarSirenInUse ::= BIT STRING { lightBarActivated (0), sirenActivated (1) } (SIZE(2))`
Definition	It describes the status of light bar and any sort of audible alarm system besides the horn. This includes various common sirens as well as backup up beepers and other slow speed manoeuvring alerts. When the light bar or audible alarm is active, the corresponding bits shall be set to 1. Otherwise, it shall be set to 0.
Unit	N/A
Category	Vehicle information

A.44 DE_Longitude

Descriptive Name	DE_ Longitude
Identifier	DataType_ 44
ASN.1 representation	`Longitude ::= INTEGER {oneMicrodegreeEast (10), oneMicrodegreeWest (-10), unavailable(1800000001) } (-1800000000..1800000001)`
Definition	Absolute geographical longitude in a WGS84 co-ordinate system, providing a range of 180 degrees to the east or to the west of the prime meridian. Negative values are used for longitudes to the west, positive values are used for longitudes to the east. When the information is unavailable, the value shall be set to 1 800 000 001. The DE is used in *CenDsrcTollingZone* DF as defined in clause A.105, *ProtectedCommunicationZone* DF as defined in clause A.121 and *ReferencePosition* DF as defined in clause A.124.
Unit	0,1 microdegree
Category	GeoReference information

A.45 DE_LongitudinalAccelerationValue

Descriptive Name	LongitudinalAccelerationValue
Identifier	DataType_ 45
ASN.1 representation	`LongitudinalAccelerationValue ::= INTEGER {pointOneMeterPerSecSquaredForward(1), pointOneMeterPerSecSquaredBackward(-1), unavailable(161)} (-160 .. 161)`
Definition	Vehicle acceleration at longitudinal direction in the centre of the mass of the empty vehicle. It corresponds to the vehicle coordinate system as specified in ISO 8855 [2]. Negative values indicate that the vehicle is braking. For values equal to or greater than 16 m/s^2, the value shall be set to -160. Positive values indicate that the vehicle is accelerating. For acceleration equal to or greater than 16 m/s^2 the value shall be set to 160. When the data is unavailable, the value shall be set to 161. This acceleration is along the tangent plane of the road surface and does not include gravity components. The DE is used in *LongitudinalAcceleration* DF as defined in clause A.116. NOTE: The empty load vehicle is defined in ISO 1176 [i.9], clause 4.6.
Unit	0,1 m/s^2
Category	Vehicle information

A.46 DE_NumberOfOccupants

Descriptive Name	NumberOfOccupants
Identifier	DataType_ 46
ASN.1 representation	`NumberOfOccupants ::= INTEGER {oneOccupant (1), unavailable(127)} (0 .. 127)`
Definition	Number of occupants in a vehicle. For values equal to or higher than 126, the value shall be set to 126. If the information is not available, the value shall be set to 127.
Unit	1 person
Category	Other information

A.47 DE_PathDeltaTime

Descriptive Name	PathDeltaTime
Identifier	DataType_ 47
ASN.1 representation	`PathDeltaTime ::= INTEGER {tenMilliSecondsInPast(1)} (1..65535, ...)`
Definition	This DE defines the recorded or estimated travel time separated between a position and a predefined reference position. It may be used to describe the historical path travelled by an ITS-S in mobility (e.g. vehicle ITS-S) as specified in ETSI EN 302 637-2 [i.2]. The DE is used in *EventPoint* DF as defined in clause A.111 and *PathPoint* DF as defined in clause A.118.
Unit	0,01 second
Category	GeoReference information

A.48 DE_PerformanceClass

Descriptive Name	PerformanceClass
Identifier	DataType_ 48
ASN.1 representation	`PerformanceClass ::= INTEGER {unknown(0), performanceClassA(1), performanceClassB(2)} (0..7)`
Definition	This DE denotes the ability of an ITS-S to provide up-to-date information. A performance class value is used to describe age of data. The exact values are out of scope of the present document. As defined in ETSI TS 101 539-1 [i.6], performance class A shall be set to 1, performance class B shall be set to 2. When the performance class is unknown, it shall be set to 0. Values in the range 3 to 7 are reserved for future use.
Unit	N/A
Category	Vehicle information

A.49 DE_PosCentMass

Descriptive Name	PosCentMass
Identifier	DataType_ 49
ASN.1 representation	`PosCentMass ::= INTEGER {tenCentimeters(1), unavailable(63)} (1..63)`
Definition	It indicates the perpendicular distance from the centre of mass of an empty load vehicle to the front line of the vehicle bounding box of the empty load vehicle. For values equal to or higher than 6,2 metres, the data value be set to 62. The value shall be set to 63 if the information is unavailable. NOTE: The empty load vehicle is defined in ISO 1176 [i.9], clause 4.6.
Unit	0,1 metre
Category	Vehicle information

A.50 DE_PositioningSolutionType

Descriptive Name	PositioningSolutionType
Identifier	DataType_ 50
ASN.1 representation	`PositioningSolutionType ::= ENUMERATED {noPositioningSolution(0), sGNSS(1), dGNSS(2), sGNSSplusDR(3), dGNSSplusDR(4), dR(5), ...}`
Definition	It indicates the positioning technology being used to estimate a geographical position. It covers the following positioning solutions: • sGNSS(1): Global Navigation Satellite System, • dGNSS(2): Differential GNSS, • sGNSSplusDR(3): GNSS and dead reckoning, • dGNSSplusDR(4): Differential GNSS and dead reckoning, • dR(5): dead reckoning.
Unit	N/A
Category	GeoReference information

A.51 DE_PositionOfOccupants

Descriptive Name	PositionOfOccupants
Identifier	DataType_ 51

ASN.1 representation	`PositionOfOccupants ::= BIT STRING {`
	` row1LeftOccupied (0),`
	` row1RightOccupied (1),`
	` row1MidOccupied (2),`
	` row1NotDetectable (3),`
	` row1NotPresent (4),`
	` row2LeftOccupied (5),`
	` row2RightOccupied (6),`
	` row2MidOccupied (7),`
	` row2NotDetectable (8),`
	` row2NotPresent (9),`
	` row3LeftOccupied (10),`
	` row3RightOccupied (11),`
	` row3MidOccupied (12),`
	` row3NotDetectable (13),`
	` row3NotPresent (14),`
	` row4LeftOccupied (15),`
	` row4RightOccupied (16),`
	` row4MidOccupied (17),`
	` row4NotDetectable (18),`
	` row4NotPresent (19) } (SIZE(20))`

Definition	It indicates whether a passenger seat is occupied or whether the occupation status is detectable or not. The number of row in vehicle seats layout is counted in rows from the driver row backwards from front to the rear of the vehicle. The left side seat of a row refers to the left hand side seen from vehicle rear to front. Additionally, a bit is reserved for each seat row, to indicate if the seat occupation of a row is detectable or not, i.e. row1NotDetectable (3), row2NotDetectable(8), row3NotDetectable(13) and row4NotDetectable(18). Finally, a bit is reserved for each row seat to indicate if the seat row is present or not in the vehicle, i.e. row1NotPresent (4), row2NotPresent (9), row3NotPresent(14), row4NotPresent(19). When a seat is detected to be occupied, the corresponding seat occupation bit shall be set to 1. For example, when the row 1 left seat is occupied, row1LeftOccupied(0) bit shall be set to 1. When a seat is detected to be not occupied, the corresponding seat occupation bit shall be set to 0. Otherwise, the value of seat occupation bit shall be set according to the following conditions: • If the seat occupation of a seat row is not detectable, the corresponding bit shall be set to 1. When any seat row not detectable bit is set to 1, all corresponding seat occupation bits of the same row shall be set to 1. • If the seat row is not present, the corresponding not present bit of the same row shall be set to 1. When any of the seat row not present bit is set to 1, the corresponding not detectable bit for that row shall be set to 1, and all the corresponding seat occupation bits in that row shall be set to 0.
Unit	N/A
Category	Vehicle information

A.52 DE_PosFrontAx

Descriptive Name	PosFrontAx
Identifier	DataType_ 52
ASN.1 representation	`PosFrontAx ::= INTEGER {tenCentimeters(1), unavailable(20)} (1..20)`
Definition	Perpendicular distance between the vehicle front line of the bounding box and the front wheel axle in 10 centimetres. For values equal to or higher than 1,9 metres, the DE shall be set to 19. The value shall bet set to 20 if the information is unavailable.
Unit	10 centimetres
Category	Vehicle information

A.53 DE_PosLonCarr

Descriptive Name	PosLonCarr
Identifier	DataType_ 53
ASN.1 representation	`PosLonCarr ::= INTEGER {oneCentimeter(1), unavailable(127)} (1..127)`
Definition	Distance from the centre of vehicle front bumper to the right or left longitudinal carrier of vehicle. The left/right carrier refers to the left/right as seen from a passenger sitting in the vehicle. For values equal to or higher than 1,26 metres, the value shall be set to 126. If the information is unavailable, the value shall be set to 127.
Unit	0,01 metre
Category	Vehicle information

A.54 DE_PosPillar

Descriptive Name	PosPillar
Identifier	DataType_ 54
ASN.1 representation	`PosPillar ::= INTEGER {tenCentimeters(1), unavailable(30)} (1..30)`
Definition	It indicates the perpendicular inter-distance of neighbouring pillar axis of vehicle starting from the middle point of the front line of the vehicle bounding box. For values equal to or greater than 2,9 metres, the value shall be set to 29. The value shall be set to 30 if the information is unavailable. The DE is used in *PositionOfPillars* DF as defined in clause A.120.
Unit	0,1 metre
Category	Vehicle information

A.55 DE_PostCrashSubCauseCode

Descriptive Name	PostCrashSubCauseCode
Identifier	DataType_ 55
ASN.1 representation	`PostCrashSubCauseCode ::= INTEGER {unavailable(0), accidentWithoutECallTriggered (1), accidentWithECallManuallyTriggered (2), accidentWithECallAutomaticallyTriggered (3), accidentWithECallTriggeredWithoutAccessToCellularNetwork(4)} (0..255)`
Definition	Encoded value of the sub cause codes of the event type "postCrash" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.4 of ETSI EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on post crash event is unavailable, • accidentWithoutECallTriggered(1): in case no eCall has been triggered for an accident, • accidentWithECallManuallyTriggered (2): in case eCall has been manually triggered and transmitted to eCall back end, • accidentWithECallAutomaticallyTriggered (3): in case eCall has been automatically triggered and transmitted to eCall back end, • accidentWithECallTriggeredWithoutAccessToCellularNetwork(4): in case eCall has been triggered but cellular network is not accessible from triggering vehicle, • value 5-255: reserved for future usage.
Unit	N/A
Category	Traffic information

A.56 DE_ProtectedZoneID

Descriptive Name	ProtectedZoneID
Identifier	DataType_ 56
ASN.1 representation	`ProtectedZoneID ::= INTEGER (0..134217727)`
Definition	ID of a protected communication zone. This DE is used in *CenDsrcTollingZoneID* DE as defined in clause A.11 and in *ProtectedCommunicationZone* DF as defined in clause A.121.
Unit	N/A
Category	Infrastructure information, Communication information

A.57 DE_ProtectedZoneRadius

Descriptive Name	ProtectedZoneRadius
Identifier	DataType_ 57
ASN.1 representation	`ProtectedZoneRadius ::= INTEGER {oneMeter(1)} (1..255,...)`
Definition	Radius of a protected communication zone. This DE is used in *ProtectedCommunicationZone* DF as defined in clause A.121.
Unit	Metre
Category	Infrastructure information, Communication information

A.58 DE_ProtectedZoneType

Descriptive Name	ProtectedZoneType
Identifier	DataType_ 58
ASN.1 representation	`ProtectedZoneType::= ENUMERATED { permanentCenDsrcTolling (0), ..., temporaryCenDsrcTolling (1) }`
Definition	DE that defines the type of a protected communication zone, so that an ITS-S is aware of the actions to do while passing by such zone (e.g. reduce the transmit power in case of a DSRC tolling station). The protected zone type is defined in ETSI TS 102 792 [i.16]. The DE is used in ProtectedCommunicationZone DF as defined in clause A.121.
Unit	N/A
Category	Communication information

A.59 DE_PtActivationData

Descriptive Name	PtActivationData
Identifier	DataType_ 59
ASN.1 representation	`PtActivationData ::= OCTET STRING (SIZE(1..20))`
Definition	DE used for various tasks in the public transportation environment, especially for controlling traffic signal systems to prioritize and speed up public transportation in urban area (e.g. intersection "bottlenecks"). The traffic lights may be controlled by an approaching bus or tram automatically. This permits "In Time" activation of the green phase, will enable the individual traffic to clear a potential traffic jam in advance. Thereby the approaching bus or tram may pass an intersection with activated green light without slowing down the speed due to traffic congestion. Other usage of the DE is the provision of information like the public transport line number or the schedule delay of a public transport vehicle. The DE is used in *PtActivation* DF as defined in clause A.123.
Unit	N/A
Category	Vehicle information

A.60 DE_PtActivationType

Descriptive Name	PtActivationType
Identifier	DataType_ 60
ASN.1 representation	`PtActivationType ::= INTEGER {undefinedCodingType(0), r09-16CodingType(1), vdv-50149CodingType(2)} (0..255)`
Definition	This DE indicates a certain coding type of the PtActivationData data. • 0: undefined coding type, • 1: coding of PtActivationData conform to VDV recommendation 420 [i.8], • 2: coding of PtActivationData based on VDV recommendation 420 [i.8]. The values 3 to 255 are reserved for alternative and future use. The DE is used in *PtActivation* DF as defined in clause A.123.
Unit	N/A
Category	Vehicle information

A.61 DE_RelevanceDistance

Descriptive Name	RelevanceDistance
Identifier	DataType_ 61
ASN.1 representation	`RelevanceDistance ::= ENUMERATED {lessThan50m(0), lessThan100m(1), lessThan200m(2), lessThan500m(3), lessThan1000m(4), lessThan5km(5), lessThan10km(6), over10km(7)}`
Definition	DE describing a distance of relevance for information indicated in a message, for example, it may be used to describe the distance of relevance of an event indicated in a DENM as defined in ETSI EN 302 637-3 [i.3].
Unit	N/A
Category	GeoReference information

A.62 DE_RelevanceTrafficDirection

Descriptive Name	RelevanceTrafficDirection
Identifier	DataType_ 62
ASN.1 representation	`RelevanceTrafficDirection ::= ENUMERATED {allTrafficDirections(0), upstreamTraffic(1), downstreamTraffic(2), oppositeTraffic(3)}`
Definition	DE describing a traffic direction that is relevant to information indicated in a message. For example, it may be used to describe traffic direction which is relevant to an event indicated by a DENM as defined in ETSI EN 302 637-3 [i.3], The terms "upstream", "downstream" and "oppositeTraffic" are relative to the event position. NOTE: Upstream traffic corresponds to the incoming traffic towards the event position, and downstream traffic to the departing traffic away from the event position.
Unit	N/A
Category	GeoReference information

A.63 DE_RequestResponseIndication

Descriptive Name	RequestResponseIndication
Identifier	DataType_ 63
ASN.1 representation	`RequestResponseIndication ::= ENUMERATED {request(0), response(1)}`
Definition	This DE includes whether an ITS message is transmitted as request from ITS-S or a response transmitted from ITS-S after receiving request from other ITS-Ss.
Unit	N/A
Category	Communication information

A.64 DE_RescueAndRecoveryWorkInProgressSubCause Code

Descriptive Name	RescueAndRecoveryWorkInProgressSubCauseCode
Identifier	DataType_ 64
ASN.1 representation	`RescueAndRecoveryWorkInProgressSubCauseCode ::= INTEGER {unavailable(0), emergencyVehicles(1), rescueHelicopterLanding(2), policeActivityOngoing(3), medicalEmergencyOngoing(4), childAbductionInProgress(5)} (0..255)`
Definition	Encoded value of the sub cause codes of the event type "rescueAndRecoveryWorkInProgress" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.4 of ETSI EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on rescue and recovery work is unavailable, • emergencyVehicles(1): in case rescue work is ongoing by emergency vehicles, • rescueHelicopterLanding(2): in case rescue helicopter is landing, • policeActivityOngoing(3): in case police activity is ongoing, • medicalEmergencyOngoing(4): in case medical emergency recovery is ongoing, • childAbductionInProgress (5): in case a child kidnapping alarm is activated and rescue work is ongoing, • value 6-255: reserved for future usage.
Unit	N/A
Category	Traffic information

A.65 DE_RoadType

Descriptive Name	RoadType
Identifier	DataType_ 65

ASN.1 representation	`RoadType ::= ENUMERATED {`
	` urban-NoStructuralSeparationToOppositeLanes(0),`
	` urban-WithStructuralSeparationToOppositeLanes(1),`
	` nonUrban-NoStructuralSeparationToOppositeLanes(2),`
	` nonUrban-WithStructuralSeparationToOppositeLanes(3)}`

Definition	Type of a road segment. Definition of road type is out of scope of the present document.
Unit	N/A
Category	Road Topology Information

A.66 DE_RoadworksSubCauseCode

Descriptive Name	RoadworksSubCauseCode
Identifier	DataType_ 66
ASN.1 representation	`RoadworksSubCauseCode ::= INTEGER {unavailable(0), majorRoadworks(1), roadMarkingWork(2), slowMovingRoadMaintenance(3), shortTermStationaryRoadworks(4), streetCleaning(5), winterService(6)} (0..255)`
Definition	Encoded value of the sub cause codes of the event type "roadworks" as defined in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.4 of ETSI EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on roadworks is unavailable, • majorRoadworks(1): in case a major roadworks is ongoing, • roadMarkingWork(2): in case a road marking work is ongoing, • slowMovingRoadMaintenance(3): in case slow moving road maintenance work is ongoing, • shortTermStationaryRoadworks(4): in case a short term stationary roadwork is ongoing, • streetCleaning(5): in case a vehicle street cleaning work is ongoing, • winterService(6): in case winter service work is ongoing, • value 7-255: reserved for future usage.
Unit	N/A
Category	Traffic information

A.67 DE_SemiAxisLength

Descriptive Name	SemiAxisLength
Identifier	DataType_ 67
ASN.1 representation	`SemiAxisLength ::= INTEGER{oneCentimeter(1), outOfRange (4094), unavailable(4095)} (0..4095)`
Definition	Absolute position accuracy in one of the axis direction as defined in a shape of ellipse with a predefined confidence level (e.g. 95 %). The required confidence level is defined by the corresponding standards applying the DE. The value shall be set to: • 1 if the accuracy is equal to or less than 1 cm, • n (n > 1 and n < 4 093) if the accuracy is equal to or less than n cm, • 4 093 if the accuracy is equal to or less than 4 093 cm, • 4 094 if the accuracy is out of range, i.e. greater than 4 093 cm, • 4 095 if the accuracy information is unavailable. The DE is used in *PosConfidenceEllipse* DF as defined in clause A.119. NOTE: The fact that a position coordinate value is received with confidence set to 'unavailable(4095)' can be caused by several reasons, such as: – the sensor cannot deliver the accuracy at the defined confidence level because it is a low-end sensor, – the sensor cannot calculate the accuracy due to lack of variables, or – there has been a vehicle bus (e.g. CAN bus) error. In all 3 cases above, the reported position coordinate value may be valid and used by the application. If a position coordinate value is received and its confidence is set to 'outOfRange(4094)', it means that the reported position coordinate value is not valid and therefore cannot be trusted. Such value is not useful for the application.
Unit	1 centimetre
Category	GeoReference information

A.68 DE_SequenceNumber

Descriptive Name	SequenceNumber
Identifier	DataType_ 68
ASN.1 representation	`SequenceNumber ::= INTEGER (0..65535)`
Definition	Sequence number. The DE is used in *ActionID* as defined in clause A.102.
Unit	N/A
Category	Other information

A.69 DE_SignalViolationSubCauseCode

Descriptive Name	SignalViolationSubCauseCode
Identifier	DataType_ 69
ASN.1 representation	`SignalViolationSubCauseCode ::= INTEGER {unavailable(0), stopSignViolation(1), trafficLightViolation(2), turningRegulationViolation(3)} (0..255)`
Definition	Encoded value of the sub cause codes of the event type "signalViolation" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.4 of ETSI EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on signal violation event is unavailable, • stopSignViolation(1): in case a stop sign violation is detected, • trafficLightViolation(2): in case a traffic light violation is detected, • turningRegulationViolation(3): in case a turning regulation violation is detected, • value 4-255: reserved for future usage.
Unit	N/A
Category	Traffic information

A.70 DE_SlowVehicleSubCauseCode

Descriptive Name	SlowVehicleSubCauseCode
Identifier	DataType_ 70
ASN.1 representation	`SlowVehicleSubCauseCode ::= INTEGER {unavailable(0), maintenanceVehicle(1), vehiclesSlowingToLookAtAccident(2), abnormalLoad(3), abnormalWideLoad(4), convoy(5), snowplough(6), deicing(7), saltingVehicles(8)} (0..255)`
Definition	Encoded value of the sub cause codes of the event type "slowVehicle" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.4 of ETSI EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on slow vehicle driving event is unavailable, • maintenanceVehicle(1): in case of a slow driving maintenance vehicle on the road, • vehiclesSlowingToLookAtAccident(2): in case vehicle is temporally slowing down to look at accident, spot, etc., • abnormalLoad(3): in case an abnormal loaded vehicle is driving slowly on the road, • abnormalWideLoad(4): in case an abnormal wide load vehicle is driving slowly on the road, • convoy(5): in case of slow driving convoy on the road, • snowplough(6): in case of slow driving snow plough on the road, • deicing(7): in case of slow driving de-icing vehicle on the road, • saltingVehicles(8): in case of slow driving salting vehicle on the road, • value 9-255: reserved for future usage.
Unit	N/A
Category	Traffic information

A.71 DE_SpecialTransportType

Descriptive Name	SpecialTransportType
Identifier	DataType_ 71
ASN.1 representation	`SpecialTransportType ::= BIT STRING {heavyLoad(0), excessWidth(1), excessLength(2), excessHeight(3)} (SIZE(4))`
Definition	It indicates if a vehicle is carrying goods with heavy load, excess width, excess length or excess height. The corresponding bit shall be set to 1 when the special transport applies to the corresponding case. Otherwise, the corresponding bit shall be set to 0.
Unit	N/A
Category	Vehicle information

A.72 DE_SpeedConfidence

Descriptive Name	SpeedConfidence
Identifier	DataType_ 72
ASN.1 representation	`SpeedConfidence ::= INTEGER {equalOrWithinOneCentimeterPerSec(1), equalOrWithinOneMeterPerSec(100), outOfRange(126), unavailable(127)} (1..127)`
Definition	The absolute accuracy of a speed value information for a predefined confidence level. The required confidence level is defined by the station applying this DE. The value shall be set to: • 1 if the speed accuracy is equal to or less than 1 cm/s. • n (n > 1 and n < 125) if the speed accuracy is equal to or less than n cm/s. • 125 if the speed accuracy is equal to or less than 125 cm/s. • 126 if the speed accuracy is out of range, i.e. greater than 125 cm/s. • 127 if the speed accuracy information is not available. The DE is used in *Speed* DF as defined in clause A.126. NOTE: The fact that a speed value is received with confidence set to 'unavailable(127)' can be caused by several reasons, such as: – the sensor cannot deliver the accuracy at the defined confidence level because it is a low-end sensor, – the sensor cannot calculate the accuracy due to lack of variables, or – there has been a vehicle bus (e.g. CAN bus) error. In all 3 cases above, the reported speed value may be valid and used by the application. If a speed value is received and its confidence is set to 'outOfRange(126)', it means that the reported speed value is not valid and therefore cannot be trusted. Such is not useful for the application.
Unit	cm/s
Category	Vehicle information

A.73 DE_SpeedLimit

Descriptive Name	SpeedLimit
Identifier	DataType_ 73
ASN.1 representation	`SpeedLimit ::= INTEGER {oneKmPerHour(1)} (1..255)`
Definition	Speed limitation applied to a geographical position, a road section or a geographical region.
Unit	km/h
Category	Infrastructure information, traffic information

A.74 DE_SpeedValue

Descriptive Name	SpeedValue
Identifier	DataType_ 74
ASN.1 representation	`SpeedValue ::= INTEGER {standstill(0), oneCentimeterPerSec(1), unavailable(16383)} (0..16383)`
Definition	A speed value. For values equal to or greater than 163,82 m/s, the value shall be set to 16 382. When the information is not available, the value shall be set to 16 383. The DE is used in *Speed* DF as defined in clause A.126.
Unit	0,01 m/s
Category	Vehicle information

A.75 DE_StationarySince

Descriptive Name	StationarySince
Identifier	DataType_ 75
ASN.1 representation	`StationarySince ::= ENUMERATED {lessThan1Minute(0), lessThan2Minutes(1), lessThan15Minutes(2), equalOrGreater15Minutes(3)}`
Definition	It indicates the duration in minutes of a vehicle being stationary. For a vehicle being stationary since equal to or greater than 15 minutes, the value shall be set to 3.
Unit	N/A
Category	Infrastructure information, traffic information

A.76 DE_StationaryVehicleSubCauseCode

Descriptive Name	StationaryVehicleSubCauseCode
Identifier	DataType_ 76
ASN.1 representation	`StationaryVehicleSubCauseCode ::= INTEGER {unavailable(0), humanProblem(1), vehicleBreakdown(2), postCrash(3), publicTransportStop(4), carryingDangerousGoods(5)} (0..255)`
Definition	Encoded value of the sub cause codes of the event type "stationaryVehicle" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.4 of ETSI EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on stationary vehicle is unavailable, • humanProblem(1): in case stationary vehicle is due to health problem of driver or passenger, • vehicleBreakdown(2): in case stationary vehicle is due to vehicle break down, • postCrash(3): in case stationary vehicle is caused by collision, • publicTransportStop(4): in case public transport vehicle is stationary at bus stop, • carryingDangerousGoods(5): in case the stationary vehicle is carrying dangerous goods, • value 6-255: reserved for future usage.
Unit	N/A
Category	Traffic information

A.77 DE_StationID

Descriptive Name	StationID
Identifier	DataType_ 77
ASN.1 representation	`StationID ::=  INTEGER(0..4294967295)`
Definition	Identifier for an ITS-S. The ITS-S ID may be a pseudonym. It may change over space and/or over time. The DE is used in *ActionID* DF as defined in clause A.102 and *ItsPduHeader* DF as defined in clause A.114.
Unit	N/A
Category	Communication information

A.78 DE_StationType

Descriptive Name	StationType
Identifier	DataType_ 78
ASN.1 representation	`StationType ::= INTEGER {unknown(0), pedestrian(1), cyclist(2), moped(3), motorcycle(4), passengerCar(5), bus(6), lightTruck(7), heavyTruck(8), trailer(9), specialVehicles(10), tram(11), roadSideUnit(15)} (0..255)`
Definition	The type of technical context the ITS-S is integrated in. The station type depends on the integration environment of ITS-S into vehicle, mobile devices or at infrastructure. The value shall be set to: • unknown(0): information about the ITS-S context is not provided, • pedestrian(1): ITS-S carried by human being traveling on foot, incl. possible use of roller skates or skateboards, • cyclist(2): ITS-S mounted on non-motorized unicycles, bicycles , tricycles, quadracycles, • moped(3): ITS-S mounted on light motor vehicles with less than four wheels as defined in UNECE/TRANS/WP.29/78/Rev.4 [i.18] class L1, L2, • motorcycles(4): ITS-S mounted on motor vehicles with less than four wheels as defined in UNECE/TRANS/WP.29/78/Rev.4 [i.18] class L3, L4, L5, L6, L7, • passengerCar(5): ITS-S mounted on small passenger vehicles as defined in UNECE/TRANS/WP.29/78/Rev.4 [i.18] class M1, • bus(6): ITS-S mounted on large passenger vehicles as defined in UNECE/TRANS/WP.29/78/Rev.4 [i.18] class M2, M3, • lightTruck(7): ITS-S mounted on light Goods Vehicles as defined in UNECE/TRANS/WP.29/78/Rev.4 [i.18] class N1, • heavyTruck(8): ITS-S mounted on Heavy Goods Vehicles as defined in UNECE/TRANS/WP.29/78/Rev.4 [i.18] class N2 and N3, • trailer(9): ITS-S mounted on an unpowered vehicle that is intended to be towed by a powered vehicle as defined in UNECE/TRANS/WP.29/78/Rev.4 [i.18] class O, NOTE: Only to be used when not towed. • specialVehicles(10): ITS-S mounted on vehicles which have special purposes other than the above (e.g. moving road works vehicle), • tram(11): ITS-S mounted on a vehicle which runs on tracks along public streets, • roadSideUnit(15): ITS-S mounted on an infrastructure typically positioned outside of the drivable roadway (e.g. on a gantry, on a pole, on a stationary road works trailer); the infrastructure is static during the entire operation period of the ITS-S (e.g. no stop and go activity), • value 16-255: reserved for future usage. The DE is used in *RestrictedTypes* DF as defined in clause A.125.
Unit	N/A
Category	Other information

A.79 DE_SteeringWheelAngleConfidence

Descriptive Name	SteeringWheelAngleConfidence
Identifier	DataType_ 79
ASN.1 representation	`SteeringWheelAngleConfidence ::= INTEGER {equalOrWithinOnePointFiveDegree(1), outOfRange(126), unavailable(127)} (1..127)`
Definition	Absolute accuracy for a reported steering wheel angle value for a predefined confidence level (e.g. 95 %). The required confidence level is defined by the station applying this DE. The value shall be set to: • 1 if the steering wheel angle accuracy is equal to or less than 1,5 degrees, • n (n > 1 and n < 125) if the steering wheel angle accuracy is equal to or less than n × 1,5 degrees, • 125 if the steering wheel angle accuracy is equal to or less than 1,5 degrees ×125 = 187,5 degrees, • 126 if the accuracy is out of range, i.e. greater than 187,5 degrees, • 127 if the accuracy information is not available. The DE is used in *SteeringWheelAngle* DF as defined in clause A.127. NOTE: The fact that a steering wheel angle value is received with confidence set to 'unavailable(127)' can be caused by several reasons, such as: – the sensor cannot deliver the accuracy at the defined confidence level because it is a low-end sensor, – the sensor cannot calculate the accuracy due to lack of variables, or – there has been a vehicle bus (e.g. CAN bus) error. In all 3 cases above, the reported steering wheel angle value may be valid and used by the application. If a steering wheel angle value is received and its confidence is set to 'outOfRange(126)', it means that the reported steering wheel angle value is not valid and therefore cannot be trusted. Such value is not useful for the application.
Unit	1,5 degrees
Category	Vehicle information

A.80 DE_SteeringWheelAngleValue

Descriptive Name	SteeringWheelAngleValue
Identifier	DataType_ 80
ASN.1 representation	`SteeringWheelAngleValue ::= INTEGER {straight(0), onePointFiveDegreesToRight(-1), onePointFiveDegreesToLeft(1), unavailable(512)} (-511..512)`
Definition	Steering wheel angle of the vehicle at certain point in time. Positive values indicate that the steering wheel angle is turning counter-clockwise (i.e. to the left). Negative values shall be used when the steering wheel angle is turning clockwise (i.e. to the right). It corresponds to the vehicle coordinate system as specified in ISO 8855 [2]. The value shall be set to 511 if the steering wheel angle is equal to or greater than 511 × 1,5 degrees = 766,5 degrees to the left. The value shall be set to -511 if the steering wheel angle is equal to or greater than 511 × 1,5 degrees = 766,5 degrees to the right. When the information is not available, the value shall be set to 512. The DE is used in *SteeringWheelAngle* DF as defined in clause A.127.
Unit	1,5 degrees
Category	Vehicle information

A.81 DE_SubCauseCodeType

Descriptive Name	SubCauseCodeType
Identifier	DataType_ 81
ASN.1 representation	`SubCauseCodeType ::= INTEGER (0..255)`
Definition	Type of sub cause of a detected event as defined in ETSI EN 302 637-3 [i.3]. For DENM usage, the value as given in clause 7.1.4 of ETSI EN 302 637-3 [i.3] apply. The DE is used in CauseCode DF as defined in clause A.104. NOTE 1: The sub cause code value assignment varies based on value of causeCode as defined in clause A.10. NOTE 2: Complete list of all possible sub cause code values as given in ETSI EN 302 637-3 [i.3] is provided in the present document for information. For example, see clause A.3 for sub cause code of accident event.
Unit	N/A
Category	Traffic information

A.82 DE_TimestampIts

Descriptive Name	TimestampIts
Identifier	DataType_ 82
ASN.1 representation	`TimestampIts ::= INTEGER {utcStartOf2004(0), oneMillisecAfterUTCStartOf2004(1)} (0..4398046511103)`
Definition	Number of milliseconds since 2004-01-01T00:00:00.000Z, as specified in ISO 8601 [i.10]. EXAMPLE: The value for TimestampIts for 2007-01-01T00:00:00.000Z is 94 694 401 000 milliseconds, which includes one leap second insertion since 2004-01-01T00:00:00.000Z. The DE is used in *ProtectedCommunicationZone* DF as defined in clause A.121.
Unit	milliseconds
Category	Other Information

A.83 DE_Temperature

Descriptive Name	Temperature
Identifier	DataType_ 83
ASN.1 representation	`Temperature ::= INTEGER {equalOrSmallerThanMinus60Deg (-60), oneDegreeCelsius(1), equalOrGreaterThan67Deg(67)} (-60..67)`
Definition	Temperature. For temperature equal to or less than -60 °C, the value shall be set to -60. For temperature equal to or greater than 67 °C, the value shall be set to 67.
Unit	°C
Category	Other information

A.84 DE_TrafficConditionSubCauseCode

Descriptive Name	TrafficConditionSubCauseCode
Identifier	DataType_ 84
ASN.1 representation	`TrafficConditionSubCauseCode ::= INTEGER {unavailable(0), increasedVolumeOfTraffic(1), trafficJamSlowlyIncreasing(2), trafficJamIncreasing(3), trafficJamStronglyIncreasing(4), trafficStationary(5), trafficJamSlightlyDecreasing(6), trafficJamDecreasing(7), trafficJamStronglyDecreasing(8)} (0..255)`
Definition	Encoded value of the sub cause codes of the event type "trafficCondition" as defined in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.4 of ETSI EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on traffic jam is unavailable, • increasedVolumeOfTraffic(1): in case detected jam volume is increased, • trafficJamSlowlyIncreasing(2): in case detected traffic jam volume is increasing slowly, • trafficJamIncreasing(3): in case traffic jam volume is increasing, • trafficJamStronglyIncreasing(4): in case traffic jam volume is strongly increasing, • trafficStationary(5): in case traffic is stationary, • trafficJamSlightlyDecreasing(6): in case traffic jam volume is decreasing slowly, • trafficJamDecreasing(7): in case traffic jam volume is decreasing, • trafficJamStronglyDecreasing(8): in case traffic jam volume is decreasing rapidly, • value 9-255: reserved for future usage.
Unit	N/A
Category	Traffic information

A.85 DE_TrafficRule

Descriptive Name	TrafficRule
Identifier	DataType_ 85
ASN.1 representation	`TrafficRule ::= ENUMERATED {noPassing(0), noPassingForTrucks(1), passToRight(2), passToLeft(3), ... }`
Definition	It indicates traffic rules that apply to vehicles at a certain position. It includes the following information: • If overtaking is prohibited for all vehicles, the DE shall be set to 0. • If overtaking is prohibited for trucks, the DE shall be set to 1. • If vehicles should pass to the right lane, the DE shall be set to 2. • If vehicles should pass to the left lane, the DE shall be set to 3.
Unit	N/A
Category	Infrastructure information, traffic information

A.86 DE_TransmissionInterval

Descriptive Name	TransmissionInterval
Identifier	DataType_ 86
ASN.1 representation	`TransmissionInterval ::= INTEGER {oneMilliSecond(1), tenSeconds(10000)} (1..10000)`
Definition	Time interval between two consecutive message transmissions.
Unit	Millisecond
Category	Communication information

A.87 DE_TurningRadius

Descriptive Name	TurningRadius
Identifier	DataType_ 87
ASN.1 representation	`TurningRadius ::= INTEGER {point4Meters(1), unavailable(255)} (1..255)`
Definition	The smallest circular turn (i.e. U-turn) that the vehicle is capable of making. The value shall be set to 254 if the turning radius is equal to or greater than 254 × 0,4 metre = 101,6 metres. The value shall be set to 255 if the information is unavailable. For vehicle with tracker, the turning radius applies to the vehicle only.
Unit	0,4 metre
Category	Vehicle information

A.88 DE_ValidityDuration

Descriptive Name	ValidityDuration
Identifier	DataType_ 88
ASN.1 representation	`ValidityDuration ::= INTEGER {timeOfDetection(0), oneSecondAfterDetection(1)} (0..86400)`
Definition	Duration of a traffic event validity.
Unit	Second
Category	Traffic information

A.89 DE_VDS

Descriptive Name	VDS
Identifier	DataType_ 89
ASN.1 representation	`VDS ::= IA5String (SIZE(6))`
Definition	Vehicle Descriptor Section (VDS). The values are assigned according to ISO 3779 [i.7]. The DE is used in *VehicleIdentification* DF as defined in clause A.130.
Unit	N/A
Category	Vehicle information

A.90 DE_VehicleBreakdownSubCauseCode

Descriptive Name	VehicleBreakdownSubCauseCode
Identifier	DataType_ 90
ASN.1 representation	`VehicleBreakdownSubCauseCode ::= INTEGER {unavailable(0), lackOfFuel (1), lackOfBatteryPower (2), engineProblem(3), transmissionProblem(4), engineCoolingProblem(5), brakingSystemProblem(6), steeringProblem(7), tyrePuncture(8), tyrePressureProblem(9)} (0..255)`
Definition	Encoded value of the sub cause codes of the event type "vehicleBreakdown" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.4 of ETSI EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on cause of vehicle break down is unavailable, • lackOfFuel(1): in case vehicle break down is due to lack of fuel, • lackOfBatteryPower(2): in case vehicle break down is caused by lack of battery power, • engineProblem(3): in case vehicle break down is caused by an engine problem, • transmissionProblem(4): in case vehicle break down is caused by transmission problem, • engineCoolingProblem(5): in case vehicle break down is caused by an engine cooling problem, • brakingSystemProblem(6): in case vehicle break down is caused by a braking system problem, • steeringProblem(7): in case vehicle break down is caused by a steering problem, • tyrePuncture(8): in case vehicle break down is caused by tire puncture, • tyrePressureProblem(9); in case low tyre pressure in detected, • value 10-255: reserved for future usage.
Unit	N/A
Category	Traffic information

A.91 DE_VehicleLengthConfidenceIndication

Descriptive Name	VehicleLengthConfidenceIndication
Identifier	DataType_ 91
ASN.1 representation	`VehicleLengthConfidenceIndication ::= ENUMERATED {noTrailerPresent(0), trailerPresentWithKnownLength(1), trailerPresentWithUnknownLength(2), trailerPresenceIsUnknown(3), unavailable(4)}`
Definition	To indicate whether the presence of a trailer is detectable or whether its length is included in a reported vehicle length value. When the information is not known, the value shall be set to unavailable(4). The DE is used in *VehicleLength* DF as defined in clause A.131.
Unit	N/A
Category	Vehicle information

A.92 DE_VehicleLengthValue

Descriptive Name	VehicleLengthValue
Identifier	DataType_ 92
ASN.1 representation	`VehicleLengthValue ::= INTEGER {tenCentimeters(1), outOfRange(1022), unavailable(1023)} (1..1023)`
Definition	Length of a vehicle. The value shall be set to 1 022 if the vehicle length is equal to or greater than 102,2 metres. The value shall be set to 1 023 if the information in unavailable. The DE is used in *VehicleLength* DF as defined in clause A.131.
Unit	0,1 metre
Category	Vehicle information

A.93 DE_VehicleMass

Descriptive Name	VehicleMass
Identifier	DataType_ 93
ASN.1 representation	`VehicleMass ::= INTEGER {hundredKg(1), unavailable(1024)} (1..1024)`
Definition	Mass of an empty loaded vehicle in multiple of 100 kg. The value shall be set to 1 023 if the vehicle mass is equal to or greater than 102 300 kg. The value shall be set to 1 024 when the vehicle mass information is unavailable. NOTE: The empty load vehicle is defined in ISO 1176 [i.9], clause 4.6.
Unit	100 kg
Category	Vehicle information

A.94 DE_VehicleRole

Descriptive Name	VehicleRole
Identifier	DataType_ 94
ASN.1 representation	`VehicleRole ::= ENUMERATED {default(0), publicTransport(1), specialTransport(2), dangerousGoods(3), roadWork(4), rescue(5), emergency(6), safetyCar(7), agriculture(8), commercial(9), military(10), roadOperator(11), taxi(12), reserved1(13), reserved2(14), reserved3(15)}`
Definition	Role played by a vehicle at a point in time. The DE shall be set to: • default(0): default vehicle role as indicated by the vehicle type, • publicTransport(1): vehicle is used to operate public transport service, • specialTransport(2): vehicle is used for special transport purpose, e.g. oversized trucks, • dangerousGoods(3): vehicle is used for dangerous goods transportation, • roadWork(4): vehicle is used to realize roadwork or road maintenance mission, • rescue(5): vehicle is used for rescue purpose in case of an accident, e.g. as a towing service, • emergency(6): vehicle is used for emergency mission, e.g. ambulance, fire brigade, • safetyCar(7): vehicle is used for public safety, e.g. patrol, • agriculture(8): vehicle is used for agriculture, e.g. farm tractor as defined in CEN/TS 16157-3 [3], annex A, table A.137, • commercial(9): vehicle is used for transportation of commercial goods as defined in CEN/TS 16157-3 [3], annex A, table A.137, • military(10): vehicle is used for military purpose as defined in CEN/TS 16157-3 [3], annex A, table A.137, • roadOperator(11): vehicle is used in road operator missions as defined in CEN/TS 16157-3 [3], annex A, table A.137, • taxi(12): vehicle is used to provide an authorized taxi service as defined in CEN/TS 16157-3 [3], annex A, table A.137, • reserved(13): reserved for future usage, • reserved(14): reserved for future usage, • reserved(15): reserved for future usage.
Unit	N/A
Category	Vehicle information

A.95 DE_VehicleWidth

Descriptive Name	VehicleWidth
Identifier	DataType_ 95
ASN.1 representation	`VehicleWidth ::= INTEGER {tenCentimeters(1), outOfRange(61), unavailable(62)} (1..62)`
Definition	Width of a vehicle, including side mirrors. For a vehicle width equal to or greater than 6,1 metres, the value shall be set to 61. The value shall be set to 62 if the information is unavailable.
Unit	0,1 metre
Category	Vehicle information

A.96 DE_VerticalAccelerationValue

Descriptive Name	VerticalAccelerationValue
Identifier	DataType_ 96
ASN.1 representation	`VerticalAccelerationValue ::= INTEGER {pointOneMeterPerSecSquaredUp(1), pointOneMeterPerSecSquaredDown(-1), unavailable(161)} (-160 .. 161)`
Definition	Vehicle acceleration at vertical direction in the centre of the mass of the empty vehicle. It corresponds to the vehicle coordinate system as specified in ISO 8855 [2]. Positive values indicate that the vehicle is accelerating upwards. The value shall be set to 160 if the upwards acceleration is equal to or greater than 16 m/s^2. Negative values indicate the vehicle is accelerating downwards. The value shall be set to -160 if the downwards acceleration is equal to or greater than 16 m/s^2. The value shall be set to 161 if the information is not available. The DE is used in *VerticalAcceleration* DF as defined in clause A.129. NOTE: The empty load vehicle is defined in ISO 1176 [i.9], clause 4.6.
Unit	0,1 m/s^2
Category	Vehicle information

A.97 DE_WheelBaseVehicle

Descriptive Name	WheelBaseVehicle
Identifier	DataType_ 97
ASN.1 representation	`WheelBaseVehicle ::= INTEGER {tenCentimeters(1), unavailable(127)} (1..127)`
Definition	Perpendicular distance between front and rear axle of the wheel base of vehicle. The value shall be set to 126 if the wheel base distance is equal to or greater than 12,6 metres. The value shall be set to 127 if the information is unavailable.
Unit	0,1 metre
Category	Vehicle information

A.98 DE_WMInumber

Descriptive Name	WMInumber
Identifier	DataType_ 98
ASN.1 representation	`WMInumber ::= IA5String (SIZE(1..3))`
Definition	World Manufacturer Identifier (WMI). The values are assigned according to ISO 3779 [i.7]. The DE is used in *VehicleIdentification* DF as defined in clause A.130.
Unit	N/A
Category	Vehicle information

A.99 DE_WrongWayDrivingSubCauseCode

Descriptive Name	WrongWayDrivingSubCauseCode
Identifier	DataType_ 99
ASN.1 representation	`WrongWayDrivingSubCauseCode ::= INTEGER {unavailable(0), wrongLane(1), wrongDirection(2)} (0..255)`
Definition	Encoded value of the sub cause codes of the event type "wrongWayDriving" as defined in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.4 of ETSI EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on wrong way driving event is unavailable, • wrongLane(1): in case vehicle is driving on a lane for which it has no authorization to use, • wrongDirection(2): in case vehicle is driving in a direction that it is not allowed, • value 3-255: reserved for future usage.
Unit	N/A
Category	Traffic information

A.100 DE_YawRateConfidence

Descriptive Name	YawRateConfidence
Identifier	DataType_ 100

ASN.1 representation	`YawRateConfidence ::= ENUMERATED {`
	` degSec-000-01 (0),`
	` degSec-000-05 (1),`
	` degSec-000-10 (2),`
	` degSec-001-00 (3),`
	` degSec-005-00 (4),`
	` degSec-010-00 (5),`
	` degSec-100-00 (6),`
	` outOfRange (7),`
	` unavailable (8)`
	`}`

Definition	DE that denotes the absolute accuracy range for reported yaw rate value for a predefined confidence level (e.g. 95 %). The required confidence level is defined by the station applying this DE. The value shall be set to: • 0 if the accuracy is equal to or less than 0,01 degree/second • 1 if the accuracy is equal to or less than 0,05 degrees/second • 2 if the accuracy is equal to or less than 0,1 degree/second • 3 if the accuracy is equal to or less than 1 degree/second • 4 if the accuracy is equal to or less than 5 degrees/second • 5 if the accuracy is equal to or less than 10 degrees/second • 6 if the accuracy is equal to or less than 100 degrees/second • 7 if the accuracy is out of range, i.e. greater than 100 degrees/second • 8 if the accuracy information is unavailable The DE is used in *YawRate* DF as defined in clause A.132. NOTE: The fact that a yaw rate value is received with confidence set to 'unavailable(8)' can be caused by several reasons, such as: – the sensor cannot deliver the accuracy at the defined confidence level because it is a low-end sensor, – the sensor cannot calculate the accuracy due to lack of variables, or – there has been a vehicle bus (e.g. CAN bus) error. In all 3 cases above, the reported yaw rate value may be valid and used by the application. If a yaw rate value is received and its confidence is set to 'outOfRange(7)', it means that the reported yaw rate value is not valid and therefore cannot be trusted. Such value is not useful the application.
Unit	N/A
Category	Traffic information

A.101 DE_YawRateValue

Descriptive Name	YawRateValue
Identifier	DataType_ 101
ASN.1 representation	`YawRateValue ::= INTEGER {straight(0), degSec-000-01ToRight(-1), degSec-000-01ToLeft(1), unavailable(32767)} (-32766..32767)`
Definition	It denotes the vehicle rotation around z-axis of coordinate system centred on the centre of mass of the empty-loaded vehicle. It corresponds to the vehicle coordinate system as specified in ISO 8855 [2]. The leading sign denotes the direction of rotation. Positive values indicate that the rotation is anti-clockwise (i.e. to the left). The value shall be set to 32 766 if the yaw rate is equal to or greater than 327,66 degrees/second to the left. Negative values indicate that the rotation is clockwise (i.e. to the right). The value shall be set to -32 766 if the yaw rate is equal to or greater than 327,66 degrees/second to the right. The value shall be set to 32 767 if the information is not available. The yaw rate value shall be a raw data value, i.e. not filtered, smoothed or otherwise modified. The reading instant should be the same as for the vehicle acceleration. The DE is used in *YawRate* DF as defined in clause A.132. NOTE: The empty load vehicle is defined in ISO 1176 [i.9], clause 4.6.
Unit	0,01 degree per second.
Category	Vehicle information

A.102 DF_ActionID

Descriptive Name	ActionID
Identifier	DataType_ 102

ASN.1 representation	`ActionID ::= SEQUENCE {`
	`  originatingStationID StationID,`
	`  sequenceNumber SequenceNumber`
	`}`

Definition	Identifier used to describe a protocol action taken by an ITS-S. For example, it describes an action taken by an ITS-S to trigger a new DENM as defined in ETSI EN 302 637-3 [i.3] after detecting an event. The DF shall include the following data: • originatingStationID: ID of the ITS-S that takes the action. It shall be presented as defined in clause A.77 *StationID*, • sequenceNumber: a sequence number. It shall be presented as defined in clause A.68 *SequenceNumber.*
Unit	N/A
Category	Communication information

A.103 DF_Altitude

Descriptive Name	Altitude
Identifier	DataType_ 103

ASN.1 representation	`Altitude ::= SEQUENCE {`
	` altitudeValue AltitudeValue,`
	` altitudeConfidence AltitudeConfidence`
	`}`

Definition	Altitude and accuracy of an altitude in a WGS84 co-ordinate system. The DF shall include the following information: • altitudeValue: altitude of a geographical point. It shall be presented as specified in clause A.9 *AltitudeValue,* • altitudeConfidence: accuracy of the reported altitudeValue within a specific confidence level. It shall be presented as specified in clause A.8. This DF is used in *ReferencePosition* DF as defined in clause A.124.
Unit	N/A
Category	GeoReference information

A.104 DF_CauseCode

Descriptive Name	CauseCode
Identifier	DataType_ 104

ASN.1 representation	`CauseCode ::= SEQUENCE {`
	`  causeCode CauseCodeType,`
	`  subCauseCode SubCauseCodeType,`
	`  ...`
	` }`

Definition	Encoded value of a traffic event type. The DF shall include the following information: • causeCode: the type of a direct cause of a detected event. It shall be presented as defined in clause A.10 *CauseCodeType*, • subCauseCode: sub type of the direct cause. It shall be presented as defined in clause A.81 *SubCauseCodeType*. The values of causeCodeType and subCauseCode are defined in clause 7.1.4 of ETSI EN 302 637-3 [i.3].
Unit	N/A
Category	Traffic information

A.105 DF_CenDsrcTollingZone

Descriptive Name	CenDsrcTollingZone
Identifier	DataType_ 105

ASN.1 representation	`CenDsrcTollingZone ::= SEQUENCE {`
	`  protectedZoneLatitude Latitude,`
	`  protectedZoneLongitude Longitude,`
	`  cenDsrcTollingZoneID CenDsrcTollingZoneID OPTIONAL,`
	`  ...`
	`}`

Definition	The DF describes the position of a CEN DSRC road side equipment. The DF shall include the following information: • protectedZoneLatitude: the latitude of the CEN DSRC road side equipment. It shall be presented as defined in clause A.41 *Latitude*, • protectedZoneLongitude: the latitude of the CEN DSRC road side equipment. It shall be presented as defined in clause A.44 *Longitude*, • cenDsrcTollingZoneID: the ID of the CEN DSRC road side equipment. It shall be presented as defined in clause A.11 *CenDsrcTollingZoneID*. This DE is optional.
Unit	N/A
Category	Infrastructure information, Communication information

A.106 DF_ClosedLanes

Descriptive Name	ClosedLanes
Identifier	DataType_ 106

ASN.1 representation	`ClosedLanes ::= SEQUENCE {`
	`  innerhardShoulderStatus HardShoulderStatus OPTIONAL,`
	`outerhardShoulderStatus HardShoulderStatus OPTIONAL,`
	`drivingLaneStatus DrivingLaneStatus OPTIONAL,`
	`  ...`
	`}`

Definition	This DF indicates the opening/closure status of a lane or a set of lanes. The DF shall include the following information: • hardShoulderStatus: this information is optional and shall be included if the information is known. It indicates the open/closing status of hard shoulder lanes. It shall be presented as defined in clause A.29 *HardShoulderStatus*, • drivingLaneStatus: this information is optional and shall be included if the information is known. It indicates the open/closing status of driving lanes. It shall be presented as defined in clause A.23 *DrivingLaneStatus.* For roads with more than 13 driving lanes, the drivingLaneStatus DE shall not be set.
Unit	N/A
Category	Infrastructure information, Road topology information

A.107 DF_Curvature

Descriptive Name	Curvature
Identifier	DataType_ 107

ASN.1 representation	`Curvature ::= SEQUENCE {`
	` curvatureValue CurvatureValue,`
	` curvatureConfidence CurvatureConfidence`
	`}`

Definition	It describes the curvature of the vehicle trajectory and the accuracy. The curvature detected by a vehicle represents the curvature of actual vehicle trajectory. The DF shall include the following information: • curvatureValue: detected curvature of the vehicle trajectory. It shall be presented as defined in clause A.15 *CurvatureValue,* • curvatureConfidence: accuracy of the reported curvature value with a predefined confidence level. It shall be presented as defined in clause A.14 *CurvatureConfidence*.
Unit	N/A
Category	Vehicle Information

A.108 DF_DangerousGoodsExtended

Descriptive Name	DangerousGoodsExtended
Identifier	DataType_ 108

ASN.1 representation	`DangerousGoodsExtended ::= SEQUENCE {`
	`  dangerousGoodsType  DangerousGoodsBasic,`
	`  unNumber  INTEGER (0..9999),`
	`  elevatedTemperature  BOOLEAN,`
	`  tunnelsRestricted  BOOLEAN,`
	`  limitedQuantity  BOOLEAN,`
	`  emergencyActionCode  IA5String (SIZE(1..24)) OPTIONAL,`
	`  phoneNumber  OPTIONAL,`
	`  companyName  UTF8String (SIZE(1..24)) OPTIONAL,`
	`...`
	`}`

Definition	This DF provides a description of dangerous goods being carried by a heavy vehicle. The DF shall include the following information: • dangerousGoodsType: Type of dangerous goods, It shall be presented as defined in clause A.17 *DangerousGoodsBasic*, • unNumber: a 4-digit number that identifies the substance of the dangerous goods as specified in United Nations Recommendations on the Transport of Dangerous Goods - Model Regulations [i.5], • elevatedTemperature: whether the carried dangerous goods are transported at high temperature. If yes, the value shall be set to TRUE, • tunnelsRestricted: whether the heavy vehicle carrying dangerous goods is restricted to enter tunnels. If yes, the value shall be set to TRUE, • limitedQuantity: whether the carried dangerous goods are packed with limited quantity. If yes, the value shall be set to TRUE, • emergencyActionCode: physical signage placard at the vehicle that carries information on how an emergency service should deal with an incident. This DE is optional; it shall be present if the information is available, • phoneNumber: contact phone number of assistance service in case of incident or accident. This DE is optional, it shall be present if the information is available. It shall be presented as defined in clause A.135 PhoneNumber, • companyName: name of company that manages the transportation of the dangerous goods. This DE is optional; it shall be present if the information is available.
Unit	N/A
Category	Vehicle information

A.109 DF_DeltaReferencePosition

Descriptive Name	DeltaReferencePosition
Identifier	DataType_ 109

ASN.1 representation	`DeltaReferencePosition ::= SEQUENCE {`
	`  deltaLatitude DeltaLatitude,`
	`  deltaLongitude DeltaLongitude,`
	`  deltaAltitude DeltaAltitude`
	`}`

Definition	It defines a geographical point position as offset position to a reference geographical point. The DF shall include the following information: • deltaLatitude: a delta latitude offset with regards to the latitude value of the reference position. It shall be presented as defined in clause A.20 *DeltaLatitude*, • deltaLongitude: a delta longitude offset with regards to the longitude value of the reference position. It shall be presented as defined in clause A.21 *DeltaLongitude*, • deltaAltitude: a delta altitude offset with regards to the altitude value of the reference position, It shall be presented as defined in clause A.19 *DeltaAltitude*. The DF is used in *EventPoint* DF as defined in clause A.111 and in *PathPoint* DF as defined in clause A.118.
Unit	N/A
Category	GeoReference information

A.110 DF_EventHistory

Descriptive Name	EventHistory
Identifier	DataType_ 110
ASN.1 representation	`EventHistory::= SEQUENCE (SIZE(1..23)) OF EventPoint`
Definition	The DF consists of a list of event points which represents the dimension of a plain event in a predefined order. In case that the plain event is detected by a vehicle ITS-S, the DF consists of a list of event detection points along the path that the detecting ITS-S has travelled over some past time and/or distance. Each event point shall be presented as defined in clause A.111 *EventPoint.*
Unit	N/A
Category	GeoReference information, Traffic information

A.111 DF_EventPoint

Descriptive Name	EventPoint
Identifier	DataType_ 111

ASN.1 representation	`EventPoint ::= SEQUENCE {`
	`  eventPosition DeltaReferencePosition,`
	`  eventDeltaTime PathDeltaTime  OPTIONAL,`
	`  informationQuality InformationQuality`
	`}`

Definition	DF that describes the position, time and corresponding information quality for an event point detected to describe a plain event. The DF shall include the following information: • eventPosition: offset position of a detected event point with regards to the previous detected event point. It shall be presented as defined in clause A.109 *DeltaReferencePosition,* • eventDeltaTime: time travelled by the detecting ITS-S since the previous detected event point. It shall be presented as defined in clause A.47 *PathDeltaTime*, this field is optional. It shall be present if the information is available, • informationQuality: information quality of the detection for this event point. It shall be presented as defined in clause A.39 *InformationQuality.* This DF is used in *EventHistory* DF as defined in clause A.110.
Unit	N/A
Category	GeoReference information, traffic information

A.112 DF_Heading

Descriptive Name	Heading
Identifier	DataType_ 112

ASN.1 representation	`Heading ::= SEQUENCE {`
	` headingValue HeadingValue,`
	` headingConfidence HeadingConfidence`
	`}`

Definition	Heading in a WGS84 co-ordinates system. The DF shall include the following information: • headingValue: a heading value. It shall be presented as defined in clause A.35 *HeadingValue*, • headingConfidence: the accuracy of the reported heading value with a predefined confidence level. It shall be presented as defined in clause A.34 *HeadingConfidence*.
Unit	N/A
Category	GeoReference information, vehicle information, road topology information

A.113 DF_ItineraryPath

Descriptive Name	ItineraryPath
Identifier	DataType_ 113
ASN.1 representation	`ItineraryPath ::= SEQUENCE SIZE(1..40) OF ReferencePosition`
Definition	A path being described with a list of waypoints, each waypoint is represented with geographical position as defined in clause A.124 *ReferencePosition*.
Unit	N/A
Category	GeoReference information

A.114 DF_ItsPduHeader

Descriptive Name	ItsPduHeader
Identifier	DataType_ 114

ASN.1 representation	`ItsPduHeader ::= SEQUENCE {`
	`  protocolVersion INTEGER (0..255),`
	`  messageID INTEGER{ denm(1), cam(2), poi(3), spatem(4), mapem(5), ivim(6), ev-rsr(7), tistpgtransaction(8), srem(9), ssem(10), evcsn(11), saem(12), rtcmem(13) } (0..255),`
	`  stationID StationID`
	`}`

Definition	Common message header for application and facilities layer messages. It is included at the beginning of an ITS message as the message header. The DF shall include the following information: • protocolVersion: version of the ITS message, • messageID: Type of the ITS message. Following message type values are assigned in the present document: – denm(1): Decentralized Environmental Notification Message (DENM) as specified in ETSI EN 302 637-3 [i.3], – cam(2): Cooperative Awareness Message (CAM) as specified in ETSI EN 302 637-2 [i.2], – poi(3): Point of Interest message as specified in ETSI TS 101 556-1 [i.11], – spatem(4): Signal Phase And Timing (SPAT) message as specified in SAE J2735 [i.12] and in ETSI TS 103 301 [i.17], – mapem(5): MAP message as specified in SAE J2735 [i.12] and in ETSI TS 103 301 [i.17], – ivim(6): In Vehicle Information (IVI) message as defined in ISO TS 19321 [i.13], – ev-rsr(7): Electric vehicle recharging spot reservation message, as defined in ETSI TS 101 556-3 [i.14], – tistpgtransaction(8): messages for Tyre Information System (TIS) and – Tyre Pressure Gauge (TPG) interoperability, as specified in ETSI TS 101 556-2 i.15, – srem(9): Traffic light Signal Request Message as specified in ETSI TS 103 301 [i.17], – ssem(10): Traffic Light Signal Request Status Message as specified in ETSI TS 103 301 [i.17]. – evcsn(11): Electrical Vehicle Charging Spot Notification message as specified in ETSI TS 101 556-1 [i.11], – saem(12): Services Announcement Extended Message as specified in ETSI TS 102 890-1 i.19, – rtcmem(13): Radio Technical Commission for Maritime Services (RTCM) Message as specified in ETSI TS 103 301 [i.17], – value 14-255: reserved for future usage, • stationID: the identifier of the ITS-S that generates the ITS message in question. It shall be represented as specified in clause A.77 *StationID*.
Unit	N/A
Category	Communication information

A.115 DF_LateralAcceleration

Descriptive Name	LateralAcceleration
Identifier	DataType_ 115

ASN.1 representation	`LateralAcceleration ::= SEQUENCE {`
	`  lateralAccelerationValue LateralAccelerationValue,`
	`  lateralAccelerationConfidence AccelerationConfidence`
	`}`

Definition	It indicates the vehicle acceleration at lateral direction and the accuracy of the lateral acceleration. The DF shall include: • lateralAccelerationValue: lateral acceleration value at a point in time. It shall be presented as specified in clause A.42 *LateralAccelerationValue*, • lateralAccelerationConfidence: accuracy of the reported lateral acceleration value with a predefined confidence level. It shall be presented as defined in clause A.1 *AccelerationConfidence.*
Unit	N/A
Category	Vehicle information

A.116 DF_LongitudinalAcceleration

Descriptive Name	LongitudinalAcceleration
Identifier	DataType_ 116

ASN.1 representation	`LongitudinalAcceleration ::= SEQUENCE {`
	`  longitudinalAccelerationValue LongitudinalAccelerationValue,`
	`  longitudinalAccelerationConfidence AccelerationConfidence`
	`}`

Definition	It indicates the vehicle acceleration at longitudinal direction and the accuracy of the longitudinal acceleration. The DF shall include: • longitudinalAccelerationValue: longitudinal acceleration value at a point in time. It shall be presented as specified in clause A.45 *LongitudinalAccelerationValue*, • longitudinalAccelerationConfidence: accuracy of the reported longitudinal acceleration value with a predefined confidence level. It shall be presented as defined in clause A.1 *AccelerationConfidence.*
Unit	N/A
Category	Vehicle information

A.117 DF_PathHistory

Descriptive Name	PathHistory
Identifier	DataType_ 117
ASN.1 representation	`PathHistory::= SEQUENCE (SIZE(0..40)) OF PathPoint`
Definition	DF that defines a path with a set of path points. It may contain up to 40 path points. Each path point shall be presented as defined in clause A.118 *PathPoint*. It may be used to describe the historical path of a vehicle.
Unit	N/A
Category	GeoReference information, vehicle information

A.118 DF_PathPoint

Descriptive Name	PathPoint
Identifier	DataType_ 118

ASN.1 representation	`PathPoint ::= SEQUENCE {`
	`  pathPosition DeltaReferencePosition,`
	`  pathDeltaTime PathDeltaTime OPTIONAL`
	`}`

Definition	DF that defines a waypoint position within a path. The DF shall include the following information: • pathPosition: the waypoint position defined as an offset position with regards to a pre-defined reference position. It shall be presented as specified in clause A.109 *DeltaReferencePosition*, • pathDeltaTime: the travel time separated from a waypoint to the predefined reference position. It shall be presented as specified in clause A.47 *PathDeltaTime*. This field is OPTIONAL. It shall be present if the information is available. The DE is used in *PathHistory* DF as defined in clause A.117.
Unit	N/A
Category	GeoReference information

A.119 DF_PosConfidenceEllipse

Descriptive Name	PosConfidenceEllipse
Identifier	DataType_ 119

ASN.1 representation	`PosConfidenceEllipse ::= SEQUENCE {`
	`  semiMajorConfidence SemiAxisLength,`
	`  semiMinorConfidence SemiAxisLength,`
	`  semiMajorOrientation HeadingValue`
	`}`

Definition	DF that provides the horizontal position accuracy in a shape of ellipse with a predefined confidence level (e.g. 95 %). The centre of the ellipse shape corresponds to the reference position point for which the position accuracy is evaluated. The DF shall include the following information: • semiMajorConfidence: half of length of the major axis, i.e. distance between the centre point and major axis point of the position accuracy ellipse. It shall be presented as specified in clause A.67 *SemiAxisLength*, • semiMinorConfidence: half of length of the minor axis, i.e. distance between the centre point and minor axis point of the position accuracy ellipse. It shall be presented as specified in clause A.67 *SemiAxisLength*, • semiMajorOrientation: orientation direction of the ellipse major axis of the position accuracy ellipse with regards to the WGS84 north. It shall be presented as specified in clause A.35 *HeadingValue*. The required confidence level of the position accuracy is defined by ITS message or ITS application applying this DF. The DF is used in *ReferencePosition* DF as defined in clause A.124.
Unit	N/A
Category	GeoReference information

A.120 DF_PositionOfPillars

Descriptive Name	PositionOfPillars
Identifier	DataType_ 120
ASN.1 representation	`PositionOfPillars ::= SEQUENCE (SIZE(1..3, ...)) OF PosPillar`
Definition	Vehicle pillars refer to the vertical or near vertical support of vehicle, designated respectively as the A, B, C or D and other pillars moving in side profile view from the front to rear. The DF contains a list of distances that refer to the perpendicular distance between centre of vehicle front bumper and vehicle pillar A, between neighbour pillars until the last pillar of the vehicle. The first value of the DF refers to the perpendicular distance from the centre of vehicle front bumper to vehicle A pillar. The second value refers to the perpendicular distance from the centre position of A pillar to the B pillar of vehicle and so on until the last pillar. Each pillar position shall be presented as defined in clause A.54 *PosPillar*.
Unit	N/A
Category	Vehicle information

A.121 DF_ProtectedCommunicationZone

Descriptive Name	ProtectedCommunicationZone
Identifier	DataType_ 121

ASN.1 representation	`ProtectedCommunicationZone ::= SEQUENCE {`
	`  protectedZoneType  ProtectedZoneType,`
	`  expiryTime TimestampIts OPTIONAL,`
	`  protectedZoneLatitude  Latitude,`
	`  protectedZoneLongitude  Longitude,`
	`  protectedZoneRadius ProtectedZoneRadius OPTIONAL,`
	`  protectedZoneID ProtectedZoneID OPTIONAL,`
	`...`
	`}`

Definition	DF that describes a zone of protection inside which the ITSG5 communication should be restricted. It shall include the following information: • protectedZoneType: type of the protected zone. It shall be presented as defined in clause A.58 *ProtectedZoneType*, • expiryTime: time at which the validity of the protected communication zone will expire. It shall be presented as defined in clause A.82 *TimestampIts.* This information is optional and shall be present when the protectedZone is temporarily valid, • protectedZoneLatitude: latitude of the centre point of the protected communication zone. It shall be presented as defined in clause A.41 *Latitude*, • protectedZoneLongitude: longitude of the centre point of the protected communication zone. It shall be represented as defined in clause A.44 *Longitude*, • protectedZoneRadius: radius of the protected communication zone in metres. It shall be presented as defined in clause A.57 *ProtectedZoneRadius*. This DE is optional, it shall be present if the data is available, • protectedZoneID: the ID of the protected communication zone. It shall be presented as defined in clause A.56 *ProtectedZoneID*. This DE is optional, it shall be present if the data is available. EXAMPLE: A protected communication zone may be defined around a CEN DSRC road side equipment.
Unit	N/A
Category	Infrastructure information, Communication information

A.122 DF_ProtectedCommunicationZonesRSU

Descriptive Name	ProtectedCommunicationZonesRSU
Identifier	DataType_ 122
ASN.1 representation	`ProtectedCommunicationZonesRSU ::= SEQUENCE (SIZE(1..16)) OF ProtectedCommunicationZone`
Definition	DF that describes a list of protected communication zones by a road side ITS-S (Road Side Unit RSU). It may provide up to 16 protected communication zones information. Each protected communication zone shall be presented as defined in clause A.121 *ProtectedCommunicationZone.*
Unit	N/A
Category	Infrastructure information, Communication information

A.123 DF_PtActivation

Descriptive Name	PtActivation
Identifier	DataType_ 123

ASN.1 representation	`PtActivation ::= SEQUENCE {`
	`  ptActivationType PtActivationType,`
	`  ptActivationData PtActivationData`
	`}`

Definition	Real-time systems designed for operations control, traffic light priorities, track switches, barriers, etc. using a range of activation devices equipped in public transport vehicles. The activation of the corresponding equipment is triggered by the approach or passage of a public transport vehicle at a certain point (e.g. a beacon). This DF shall include the following information: • ptActivationType: type of activation. It shall be presented as defined in clause A.60 *PtActivationType*, • ptActicationData: data of activation. It shall be presented as defined in clause A.59 *PtActivationData*. Today there are different payload variants defined for public transport activation-data. The R09.x is one of the industry standard used by public transport vehicles (e.g. buses, trams) in Europe (e.g. Germany Austria) for controlling traffic lights, barriers, bollards, etc. This DF includes information like route, course, destination, priority, etc. The R09.x content is defined in VDV recommendation 420 [i.8]. It includes following information: • Priority Request Information (pre-request, request, ready to start) • End of Prioritization procedure • Priority request direction • Public Transport line number • Priority of public transport • Route line identifier of the public transport • Route number identification • Destination of public transport vehicle Other countries may use different message sets defined by the local administration.
Unit	N/A
Category	Vehicle information

A.124 DF_ReferencePosition

Descriptive Name	ReferencePosition
Identifier	DataType_ 124

ASN.1 representation	`ReferencePosition ::= SEQUENCE {`
	`  latitude Latitude,`
	`  longitude Longitude,`
	`  positionConfidenceEllipse PosConfidenceEllipse ,`
	`  altitude Altitude`
	`}`

Definition	The geographical position of a position or of an ITS-S. It represents a geographical point position. The DF shall include the following information: • latitude: latitude of the geographical point; it shall be presented as specified in clause A.41 *Latitude*, • longitude: longitude of the geographical point; it shall be presented as specified in clause A.44 *Longitude,* • positionConfidenceEllipse: accuracy of the geographical position; it shall be presented as specified in clause A.119 *PosConfidenceEllipse,* • altitude: altitude and altitude accuracy of the geographical point; it shall be presented as specified in clause A.103 *Altitude*. The DF is used in *ItineraryPath* DF as defined in clause A.113.
Unit	N/A
Category	GeoReference information

A.125 DF_RestrictedTypes

Descriptive Name	RestrictedTypes
Identifier	DataType_ 125
ASN.1 representation	`RestrictedTypes ::= SEQUENCE (SIZE(1..3, ...)) OF StationType`
Definition	List of ITS-S types to which a certain traffic restriction, e.g. the speed limit, applies. Each station type shall be presented as defined in clause A.78 *StationType.*
Unit	N/A
Category	Infrastructure information, Traffic information

A.126 DF_Speed

Descriptive Name	Speed
Identifier	DataType_ 126

ASN.1 representation	`Speed ::= SEQUENCE {`
	`  speedValue SpeedValue,`
	`  speedConfidence SpeedConfidence`
	`}`

Definition	It describes the speed and corresponding accuracy of the speed information for a moving object (e.g. vehicle). The DF shall include the following information: • speedValue: speed value. It shall be presented as defined in clause A.74 *SpeedValue,* • *speedConfidence:* accuracy of the reported speed value. It shall be presented as defined in clause A.72 *SpeedConfidence*.
Unit	N/A
Category	Vehicle information

A.127 DF_SteeringWheelAngle

Descriptive Name	SteeringWheelAngle
Identifier	DataType_ 127

ASN.1 representation	`SteeringWheelAngle::= SEQUENCE {`
	`  steeringWheelAngleValue SteeringWheelAngleValue,`
	`  steeringWheelAngleConfidence SteeringWheelAngleConfidence`
	`}`

Definition	Steering wheel angle of the vehicle at certain point in time. The DF shall include the following information: • steeringWheelAngleValue: steering wheel angle value. It shall be presented as defined in clause A.80 *SteeringWheelAngleValue*, • steeringWheelAngleConfidence: accuracy of the reported steering wheel angle value. It shall be presented as defined in clause A.79 *SteeringWheelAngleConfidence.*
Unit	N/A
Category	Vehicle information

A.128 DF_Traces

Descriptive Name	Traces
Identifier	DataType_ 128
ASN.1 representation	`Traces ::= SEQUENCE SIZE(1..7) OF PathHistory`
Definition	One or more paths, each path is described using a list of waypoints in a predefined order. A path shall be presented as defined in clause A.117 *PathHistory*. This DF may be used to describe location referencing information.
Unit	N/A
Category	GeoReference information

A.129 DF_VerticalAcceleration

Descriptive Name	VerticalAcceleration
Identifier	DataType_ 129

ASN.1 representation	`VerticalAcceleration ::= SEQUENCE {`
	`  verticalAccelerationValue VerticalAccelerationValue,`
	`  verticalAccelerationConfidence AccelerationConfidence`
	`}`

Definition	It indicates the vehicle acceleration at vertical direction and the accuracy of the vertical acceleration. The DF shall include: • verticalAccelerationValue: vertical acceleration value at a point in time. It shall be presented as specified in clause A.96 *VerticalAccelerationValue*, • verticalAccelerationConfidence: accuracy of the reported vertical acceleration value with a predefined confidence level. It shall be presented as defined in clause A.1 *AccelerationConfidence.*
Unit	N/A
Category	Vehicle information

A.130 DF_VehicleIdentification

Descriptive Name	VehicleIdentification
Identifier	DataType_ 130

ASN.1 representation	`VehicleIdentification ::= SEQUENCE {`
	` wMInumber WMInumber OPTIONAL,`
	` vDS VDS OPTIONAL,`
	` ...`
	`}`

Definition	This DF provides information related to the identification of a vehicle. The DF may include one or more following information: • wMInumber: World Manufacturer Identifier (WMI) code. It shall be presented as defined in clause A.98 *WMInumber*, • vDS: Vehicle Descriptor Section (VDS). It shall be presented as defined in clause A.89 *VDS*.
Unit	N/A
Category	Vehicle information

A.131 DF_VehicleLength

Descriptive Name	VehicleLength
Identifier	DataType_ 131

ASN.1 representation	`VehicleLength ::= SEQUENCE {`
	` vehicleLengthValue VehicleLengthValue,`
	` vehicleLengthConfidenceIndication VehicleLengthConfidenceIndication`
	`}`

Definition	Length of vehicle and accuracy indication information. The DF shall include the following information: • vehicleLengthValue: length of vehicle. It shall be presented as defined in clause A.92 *VehicleLengthValue*, • vehicleLengthConfidenceIndication: indication of reported length value confidence. It shall be presented as defined in clause A.91 *VehicleLengthConfidenceIndication.*
Unit	N/A
Category	Vehicle information

A.132 DF_YawRate

Descriptive Name	YawRate
Identifier	DataType_ 132

ASN.1 representation	`YawRate::= SEQUENCE {`
	` yawRateValue YawRateValue,`
	` yawRateConfidence YawRateConfidence`
	`}`

Definition	Yaw rate of vehicle at a point in time. The DF shall include the following information: • yawRateValue: yaw rate value at a point in time. It shall be presented as defined in clause A.101 *YawRateValue*, • vehicleLengthConfidenceIndication: accuracy of reported yaw rate value. It shall be presented as defined in clause A.100 *YawRateConfidence.*
Unit	N/A
Category	Vehicle information

A.133 DF_DigitalMap

Descriptive Name	DigitalMap
Identifier	DataType_ 133
ASN.1 representation	`DigitalMap ::= SEQUENCE (SIZE(1..256)) OF ReferencePosition`
Definition	Portion of digital map, described using a list of waypoints, described as *DF_ ReferencePosition* as defined in clause A.124.
Unit	N/A
Category	GeoReference information

A.134 DE_OpeningDaysHours

Descriptive Name	OpeningDaysHours
Identifier	DataType_ 134
ASN.1 representation	`OpeningDaysHours ::= UTF8String`
Definition	UTF8String description of a time period to describe the opening days and hours of a Point of Interest (for example local commerce).
Unit	N/A
Category	Other information

A.135 DF_PhoneNumber

Descriptive Name	PhoneNumber
Identifier	DataType_ 135
ASN.1 representation	`PhoneNumber ::= NumericString (SIZE(1..16))`
Definition	Phone number.
Unit	N/A
Category	Other information

Annex B (normative): ASN.1 module of the common data dictionary

The ASN.1 module of the common data dictionary shall be as specified as below.

```
ITS-Container {
itu-t (0) identified-organization (4) etsi (0) itsDomain (5) wg1 (1) ts (102894) cdd (2) version
(2)
}

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

ItsPduHeader ::= SEQUENCE {
    protocolVersion INTEGER (0..255),
    messageID INTEGER{ denm(1), cam(2), poi(3), spatem(4), mapem(5), ivim(6), ev-rsr(7),
tistpgtransaction(8), srem(9), ssem(10), evcsn(11), saem(12), rtcmem(13) } (0..255),  -- Mantis
#7209, #7005
    stationID StationID
}

StationID ::= INTEGER(0..4294967295)

ReferencePosition ::= SEQUENCE {
    latitude Latitude,
    longitude Longitude,
    positionConfidenceEllipse PosConfidenceEllipse ,
    altitude Altitude
}

DeltaReferencePosition ::= SEQUENCE {
    deltaLatitude DeltaLatitude,
    deltaLongitude DeltaLongitude,
    deltaAltitude DeltaAltitude
}

Longitude ::= INTEGER {oneMicrodegreeEast (10), oneMicrodegreeWest (-10), unavailable(1800000001)}
(-1800000000..1800000001)

Latitude ::= INTEGER {oneMicrodegreeNorth (10), oneMicrodegreeSouth (-10), unavailable(900000001)}
(-900000000..900000001)

Altitude ::= SEQUENCE {
    altitudeValue AltitudeValue,
    altitudeConfidence AltitudeConfidence
}

AltitudeValue ::= INTEGER {referenceEllipsoidSurface(0), oneCentimeter(1), unavailable(800001)} (-
100000..800001)

AltitudeConfidence ::= ENUMERATED {
    alt-000-01 (0),
    alt-000-02 (1),
    alt-000-05 (2),
    alt-000-10 (3),
    alt-000-20 (4),
    alt-000-50 (5),
    alt-001-00 (6),
    alt-002-00 (7),
    alt-005-00 (8),
    alt-010-00 (9),
    alt-020-00 (10),
    alt-050-00 (11),
    alt-100-00 (12),
    alt-200-00 (13),
    outOfRange (14),
    unavailable (15)
}

DeltaLongitude ::= INTEGER {oneMicrodegreeEast (10), oneMicrodegreeWest (-10),
unavailable(131072)} (-131071..131072)

DeltaLatitude ::= INTEGER {oneMicrodegreeNorth (10), oneMicrodegreeSouth (-10) ,
unavailable(131072)} (-131071..131072)
```

```
DeltaAltitude ::= INTEGER {oneCentimeterUp (1), oneCentimeterDown (-1), unavailable(12800)} (-
12700..12800)

PosConfidenceEllipse ::= SEQUENCE {
    semiMajorConfidence SemiAxisLength,
    semiMinorConfidence SemiAxisLength,
    semiMajorOrientation HeadingValue
}

PathPoint ::= SEQUENCE {
    pathPosition DeltaReferencePosition,
    pathDeltaTime PathDeltaTime OPTIONAL
}

PathDeltaTime ::= INTEGER {tenMilliSecondsInPast(1)} (1..65535, ...)

PtActivation ::= SEQUENCE {
    ptActivationType PtActivationType,
    ptActivationData PtActivationData
}

PtActivationType ::= INTEGER {undefinedCodingType(0), r09-16CodingType(1), vdv-50149CodingType(2)}
(0..255)

PtActivationData ::= OCTET STRING (SIZE(1..20))

AccelerationControl ::= BIT STRING {
    brakePedalEngaged (0),
    gasPedalEngaged (1),
    emergencyBrakeEngaged (2),
    collisionWarningEngaged (3),
    accEngaged (4),
    cruiseControlEngaged (5),
    speedLimiterEngaged (6)
} (SIZE(7))


SemiAxisLength ::= INTEGER{oneCentimeter(1), outOfRange(4094), unavailable(4095)} (0..4095)

CauseCode ::= SEQUENCE {
    causeCode CauseCodeType,
    subCauseCode SubCauseCodeType,
        ...
}

CauseCodeType ::= INTEGER {
    reserved (0),
    trafficCondition (1),
    accident (2),
    roadworks (3),
        impassability (5),
    adverseWeatherCondition-Adhesion (6),
        aquaplannning (7),
    hazardousLocation-SurfaceCondition (9),
    hazardousLocation-ObstacleOnTheRoad (10),
    hazardousLocation-AnimalOnTheRoad (11),
    humanPresenceOnTheRoad (12),
    wrongWayDriving (14),
    rescueAndRecoveryWorkInProgress (15),
    adverseWeatherCondition-ExtremeWeatherCondition (17),
    adverseWeatherCondition-Visibility (18),
    adverseWeatherCondition-Precipitation (19),
    slowVehicle (26),
    dangerousEndOfQueue (27),
    vehicleBreakdown (91),
    postCrash (92),
    humanProblem (93),
    stationaryVehicle (94),
    emergencyVehicleApproaching (95),
    hazardousLocation-DangerousCurve (96),
    collisionRisk (97),
    signalViolation (98),
    dangerousSituation (99)
} (0..255)

SubCauseCodeType ::= INTEGER (0..255)
```

```
TrafficConditionSubCauseCode ::= INTEGER {unavailable(0), increasedVolumeOfTraffic(1),
trafficJamSlowlyIncreasing(2), trafficJamIncreasing(3), trafficJamStronglyIncreasing(4),
trafficStationary(5), trafficJamSlightlyDecreasing(6), trafficJamDecreasing(7),
trafficJamStronglyDecreasing(8)} (0..255)

AccidentSubCauseCode ::= INTEGER {unavailable(0), multiVehicleAccident(1), heavyAccident(2),
accidentInvolvingLorry(3), accidentInvolvingBus(4), accidentInvolvingHazardousMaterials(5),
accidentOnOppositeLane(6), unsecuredAccident(7), assistanceRequested(8)} (0..255)

RoadworksSubCauseCode ::= INTEGER {unavailable(0), majorRoadworks(1), roadMarkingWork(2),
slowMovingRoadMaintenance(3), shortTermStationaryRoadworks(4), streetCleaning(5),
winterService(6)} (0..255)

HumanPresenceOnTheRoadSubCauseCode ::= INTEGER {unavailable(0), childrenOnRoadway(1),
cyclistOnRoadway(2), motorcyclistOnRoadway(3)} (0..255)

WrongWayDrivingSubCauseCode ::= INTEGER {unavailable(0), wrongLane(1), wrongDirection(2)} (0..255)

AdverseWeatherCondition-ExtremeWeatherConditionSubCauseCode ::= INTEGER {unavailable(0),
strongWinds(1), damagingHail(2), hurricane(3), thunderstorm(4), tornado(5), blizzard(6)} (0..255)

AdverseWeatherCondition-AdhesionSubCauseCode ::= INTEGER {unavailable(0), heavyFrostOnRoad(1),
fuelOnRoad(2), mudOnRoad(3), snowOnRoad(4), iceOnRoad(5), blackIceOnRoad(6), oilOnRoad(7),
looseChippings(8), instantBlackIce(9), roadsSalted(10)} (0..255)

AdverseWeatherCondition-VisibilitySubCauseCode ::= INTEGER {unavailable(0), fog(1), smoke(2),
heavySnowfall(3), heavyRain(4), heavyHail(5), lowSunGlare(6), sandstorms(7), swarmsOfInsects(8)}
(0..255)

AdverseWeatherCondition-PrecipitationSubCauseCode ::= INTEGER {unavailable(0), heavyRain(1),
heavySnowfall(2), softHail(3)} (0..255)

SlowVehicleSubCauseCode ::= INTEGER {unavailable(0), maintenanceVehicle(1),
vehiclesSlowingToLookAtAccident(2), abnormalLoad(3), abnormalWideLoad(4), convoy(5),
snowplough(6), deicing(7), saltingVehicles(8)} (0..255)

StationaryVehicleSubCauseCode ::= INTEGER {unavailable(0), humanProblem(1), vehicleBreakdown(2),
postCrash(3), publicTransportStop(4), carryingDangerousGoods(5)} (0..255)

HumanProblemSubCauseCode ::= INTEGER {unavailable(0), glycemiaProblem(1), heartProblem(2)}
(0..255)

EmergencyVehicleApproachingSubCauseCode ::= INTEGER {unavailable(0),
emergencyVehicleApproaching(1), prioritizedVehicleApproaching(2)} (0..255)

HazardousLocation-DangerousCurveSubCauseCode ::= INTEGER {unavailable(0),
dangerousLeftTurnCurve(1), dangerousRightTurnCurve(2),
multipleCurvesStartingWithUnknownTurningDirection(3), multipleCurvesStartingWithLeftTurn(4),
multipleCurvesStartingWithRightTurn(5)} (0..255)

HazardousLocation-SurfaceConditionSubCauseCode ::= INTEGER {unavailable(0), rockfalls(1),
earthquakeDamage(2), sewerCollapse(3), subsidence(4), snowDrifts(5), stormDamage(6), burstPipe(7),
volcanoEruption(8), fallingIce(9)} (0..255)

HazardousLocation-ObstacleOnTheRoadSubCauseCode ::= INTEGER {unavailable(0), shedLoad(1),
partsOfVehicles(2), partsOfTyres(3), bigObjects(4), fallenTrees(5), hubCaps(6),
waitingVehicles(7)} (0..255)

HazardousLocation-AnimalOnTheRoadSubCauseCode ::= INTEGER {unavailable(0), wildAnimals(1),
herdOfAnimals(2), smallAnimals(3), largeAnimals(4)} (0..255)

CollisionRiskSubCauseCode ::= INTEGER {unavailable(0), longitudinalCollisionRisk(1),
crossingCollisionRisk(2), lateralCollisionRisk(3), vulnerableRoadUser(4)} (0..255)

SignalViolationSubCauseCode ::= INTEGER {unavailable(0), stopSignViolation(1),
trafficLightViolation(2), turningRegulationViolation(3)} (0..255)

RescueAndRecoveryWorkInProgressSubCauseCode ::= INTEGER {unavailable(0), emergencyVehicles(1),
rescueHelicopterLanding(2), policeActivityOngoing(3), medicalEmergencyOngoing(4),
childAbductionInProgress(5)} (0..255)

DangerousEndOfQueueSubCauseCode ::= INTEGER {unavailable(0), suddenEndOfQueue(1),
queueOverHill(2), queueAroundBend(3), queueInTunnel(4)} (0..255)

DangerousSituationSubCauseCode ::= INTEGER {unavailable(0), emergencyElectronicBrakeEngaged(1),
preCrashSystemEngaged(2), espEngaged(3), absEngaged(4), aebEngaged(5), brakeWarningEngaged(6),
collisionRiskWarningEngaged(7)} (0..255)
```

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VehicleBreakdownSubCauseCode ::= INTEGER {unavailable(0), lackOfFuel (1), lackOfBatteryPower (2),
engineProblem(3), transmissionProblem(4), engineCoolingProblem(5), brakingSystemProblem(6),
steeringProblem(7), tyrePuncture(8), tyrePressureProblem(9)} (0..255)

PostCrashSubCauseCode ::= INTEGER {unavailable(0), accidentWithoutECallTriggered (1),
accidentWithECallManuallyTriggered (2), accidentWithECallAutomaticallyTriggered (3),
accidentWithECallTriggeredWithoutAccessToCellularNetwork(4)} (0..255)

Curvature ::= SEQUENCE {
 curvatureValue CurvatureValue,
 curvatureConfidence CurvatureConfidence
}

CurvatureValue ::= INTEGER {straight(0), unavailable(1023)} (-1023..1023)

CurvatureConfidence ::= ENUMERATED {
    onePerMeter-0-00002 (0),
    onePerMeter-0-0001 (1),
    onePerMeter-0-0005 (2),
    onePerMeter-0-002 (3),
    onePerMeter-0-01 (4),
    onePerMeter-0-1 (5),
    outOfRange (6),
    unavailable (7)
}

CurvatureCalculationMode ::= ENUMERATED {yawRateUsed(0), yawRateNotUsed(1), unavailable(2), ...}

Heading ::= SEQUENCE {
    headingValue HeadingValue,
    headingConfidence HeadingConfidence
}

HeadingValue ::= INTEGER {wgs84North(0), wgs84East(900), wgs84South(1800), wgs84West(2700),
unavailable(3601)} (0..3601)

HeadingConfidence ::= INTEGER {equalOrWithinZeroPointOneDegree (1), equalOrWithinOneDegree (10),
outOfRange(126), unavailable(127)} (1..127)

LanePosition::= INTEGER {offTheRoad(-1), hardShoulder(0),
outermostDrivingLane(1), secondLaneFromOutside(2)} (-1..14)

ClosedLanes ::= SEQUENCE {
    innerhardShoulderStatus HardShoulderStatus OPTIONAL,
        outerhardShoulderStatus HardShoulderStatus OPTIONAL,
    drivingLaneStatus DrivingLaneStatus OPTIONAL,
    ...
}

HardShoulderStatus ::= ENUMERATED {availableForStopping(0), closed(1), availableForDriving(2)}

DrivingLaneStatus ::= BIT STRING (SIZE (1..13))


PerformanceClass ::= INTEGER {unavailable(0), performanceClassA(1), performanceClassB(2)} (0..7)

SpeedValue ::= INTEGER {standstill(0), oneCentimeterPerSec(1), unavailable(16383)} (0..16383)

SpeedConfidence ::= INTEGER {equalOrWithinOneCentimeterPerSec(1),
equalOrWithinOneMeterPerSec(100), outOfRange(126), unavailable(127)} (1..127)

VehicleMass ::= INTEGER {hundredKg(1), unavailable(1024)} (1..1024)

Speed ::= SEQUENCE {
    speedValue SpeedValue,
    speedConfidence SpeedConfidence
}

DriveDirection ::= ENUMERATED {forward (0), backward (1), unavailable (2)}

EmbarkationStatus ::= BOOLEAN

LongitudinalAcceleration ::= SEQUENCE {
    longitudinalAccelerationValue LongitudinalAccelerationValue,
    longitudinalAccelerationConfidence AccelerationConfidence
}
```

```
LongitudinalAccelerationValue ::= INTEGER {pointOneMeterPerSecSquaredForward(1),
pointOneMeterPerSecSquaredBackward(-1), unavailable(161)} (-160 .. 161)

AccelerationConfidence ::= INTEGER {pointOneMeterPerSecSquared(1), outOfRange(101),
unavailable(102)} (0 .. 102)

LateralAcceleration ::= SEQUENCE {
    lateralAccelerationValue LateralAccelerationValue,
    lateralAccelerationConfidence AccelerationConfidence
}

LateralAccelerationValue ::= INTEGER {pointOneMeterPerSecSquaredToRight(-1),
pointOneMeterPerSecSquaredToLeft(1), unavailable(161)} (-160 .. 161)

VerticalAcceleration ::= SEQUENCE {
    verticalAccelerationValue VerticalAccelerationValue,
    verticalAccelerationConfidence AccelerationConfidence
}

VerticalAccelerationValue ::= INTEGER {pointOneMeterPerSecSquaredUp(1),
pointOneMeterPerSecSquaredDown(-1), unavailable(161)} (-160 .. 161)

StationType ::= INTEGER {unknown(0), pedestrian(1), cyclist(2), moped(3), motorcycle(4),
passengerCar(5), bus(6),
lightTruck(7), heavyTruck(8), trailer(9), specialVehicles(10), tram(11), roadSideUnit(15)}
(0..255)

ExteriorLights ::= BIT STRING {
    lowBeamHeadlightsOn      (0),
    highBeamHeadlightsOn     (1),
    leftTurnSignalOn         (2),
    rightTurnSignalOn        (3),
    daytimeRunningLightsOn   (4),
    reverseLightOn           (5),
    fogLightOn               (6),
    parkingLightsOn          (7)
} (SIZE(8))

DangerousGoodsBasic::= ENUMERATED {
    explosives1(0),
    explosives2(1),
    explosives3(2),
    explosives4(3),
    explosives5(4),
    explosives6(5),
    flammableGases(6),
    nonFlammableGases(7),
    toxicGases(8),
    flammableLiquids(9),
    flammableSolids(10),
    substancesLiableToSpontaneousCombustion(11),
    substancesEmittingFlammableGasesUponContactWithWater(12),
    oxidizingSubstances(13),
    organicPeroxides(14),
    toxicSubstances(15),
    infectiousSubstances(16),
    radioactiveMaterial(17),
    corrosiveSubstances(18),
    miscellaneousDangerousSubstances(19)
}

DangerousGoodsExtended ::= SEQUENCE {
    dangerousGoodsType DangerousGoodsBasic,
    unNumber INTEGER (0..9999),
    elevatedTemperature BOOLEAN,
    tunnelsRestricted BOOLEAN,
    limitedQuantity BOOLEAN,
    emergencyActionCode IA5String (SIZE (1..24)) OPTIONAL,
    phoneNumber PhoneNumber OPTIONAL,
    companyName UTF8String (SIZE (1..24)) OPTIONAL,
        ...
}

SpecialTransportType ::= BIT STRING {heavyLoad(0), excessWidth(1), excessLength(2),
excessHeight(3)} (SIZE(4))

LightBarSirenInUse ::= BIT STRING {
    lightBarActivated (0),
```

```
    sirenActivated (1)
} (SIZE(2))

HeightLonCarr ::= INTEGER {oneCentimeter(1), unavailable(100)} (1..100)

PosLonCarr ::= INTEGER {oneCentimeter(1), unavailable(127)} (1..127)

PosPillar ::= INTEGER {tenCentimeters(1), unavailable(30)} (1..30)

PosCentMass ::= INTEGER {tenCentimeters(1), unavailable(63)} (1..63)

RequestResponseIndication ::= ENUMERATED {request(0), response(1)}

SpeedLimit ::= INTEGER {oneKmPerHour(1)} (1..255)

StationarySince ::= ENUMERATED {lessThan1Minute(0), lessThan2Minutes(1), lessThan15Minutes(2),
equalOrGreater15Minutes(3)}

Temperature ::= INTEGER {equalOrSmallerThanMinus60Deg (-60), oneDegreeCelsius(1),
equalOrGreaterThan67Deg(67)} (-60..67)

TrafficRule ::= ENUMERATED {noPassing(0), noPassingForTrucks(1), passToRight(2), passToLeft(3),
...
}

WheelBaseVehicle ::= INTEGER {tenCentimeters(1), unavailable(127)} (1..127)

TurningRadius ::= INTEGER {point4Meters(1), unavailable(255)} (1..255)

PosFrontAx ::= INTEGER {tenCentimeters(1), unavailable(20)} (1..20)

PositionOfOccupants ::= BIT STRING {
    row1LeftOccupied (0),
    row1RightOccupied (1),
    row1MidOccupied (2),
    row1NotDetectable (3),
    row1NotPresent (4),
    row2LeftOccupied (5),
    row2RightOccupied (6),
    row2MidOccupied (7),
    row2NotDetectable (8),
    row2NotPresent (9),
    row3LeftOccupied (10),
    row3RightOccupied (11),
    row3MidOccupied (12),
    row3NotDetectable (13),
    row3NotPresent (14),
    row4LeftOccupied (15),
    row4RightOccupied (16),
    row4MidOccupied (17),
    row4NotDetectable (18),
    row4NotPresent (19)} (SIZE(20))

PositioningSolutionType ::= ENUMERATED {noPositioningSolution(0), sGNSS(1), dGNSS(2),
sGNSSplusDR(3), dGNSSplusDR(4), dR(5), ...}

VehicleIdentification ::= SEQUENCE {
    wMInumber WMInumber OPTIONAL,
    vDS VDS OPTIONAL,
    ...
}

WMInumber ::= IA5String (SIZE(1..3))

VDS ::= IA5String (SIZE(6))

EnergyStorageType ::= BIT STRING {hydrogenStorage(0), electricEnergyStorage(1),
liquidPropaneGas(2), compressedNaturalGas(3), diesel(4), gasoline(5), ammonia(6)} (SIZE(7))

VehicleLength ::= SEQUENCE {
    vehicleLengthValue VehicleLengthValue,
    vehicleLengthConfidenceIndication VehicleLengthConfidenceIndication
}

VehicleLengthValue ::= INTEGER {tenCentimeters(1), outOfRange(1022), unavailable(1023)}  (1..1023)
```

```
VehicleLengthConfidenceIndication ::= ENUMERATED {noTrailerPresent(0),
trailerPresentWithKnownLength(1), trailerPresentWithUnknownLength(2), trailerPresenceIsUnknown(3),
unavailable(4)}

VehicleWidth ::= INTEGER {tenCentimeters(1), outOfRange(61), unavailable(62)} (1..62)

PathHistory::= SEQUENCE (SIZE(0..40)) OF PathPoint

EmergencyPriority ::= BIT STRING {requestForRightOfWay(0),
requestForFreeCrossingAtATrafficLight(1)} (SIZE(2))

InformationQuality ::= INTEGER {unavailable(0), lowest(1), highest(7)} (0..7)

RoadType ::= ENUMERATED {
    urban-NoStructuralSeparationToOppositeLanes(0),
    urban-WithStructuralSeparationToOppositeLanes(1),
    nonUrban-NoStructuralSeparationToOppositeLanes(2),
    nonUrban-WithStructuralSeparationToOppositeLanes(3)}

SteeringWheelAngle ::= SEQUENCE {
    steeringWheelAngleValue SteeringWheelAngleValue,
    steeringWheelAngleConfidence SteeringWheelAngleConfidence
}

SteeringWheelAngleValue ::= INTEGER {straight(0), onePointFiveDegreesToRight(-1),
onePointFiveDegreesToLeft(1), unavailable(512)} (-511..512)

SteeringWheelAngleConfidence ::= INTEGER {equalOrWithinOnePointFiveDegree (1), outOfRange(126),
unavailable(127)} (1..127)

TimestampIts ::= INTEGER {utcStartOf2004(0), oneMillisecAfterUTCStartOf2004(1)} (0..4398046511103)

VehicleRole ::= ENUMERATED {default(0), publicTransport(1), specialTransport(2),
dangerousGoods(3), roadWork(4), rescue(5), emergency(6), safetyCar(7), agriculture(8),
commercial(9), military(10), roadOperator(11), taxi(12), reserved1(13), reserved2(14),
reserved3(15)}

YawRate::= SEQUENCE {
    yawRateValue YawRateValue,
    yawRateConfidence YawRateConfidence
}

YawRateValue ::= INTEGER {straight(0), degSec-000-01ToRight(-1), degSec-000-01ToLeft(1),
unavailable(32767)} (-32766..32767)

YawRateConfidence ::= ENUMERATED {
    degSec-000-01 (0),
    degSec-000-05 (1),
    degSec-000-10 (2),
    degSec-001-00 (3),
    degSec-005-00 (4),
    degSec-010-00 (5),
    degSec-100-00 (6),
    outOfRange (7),
    unavailable (8)
}

ProtectedZoneType::= ENUMERATED { permanentCenDsrcTolling (0), ..., temporaryCenDsrcTolling (1) }

RelevanceDistance ::= ENUMERATED {lessThan50m(0), lessThan100m(1), lessThan200m(2),
lessThan500m(3), lessThan1000m(4), lessThan5km(5), lessThan10km(6), over10km(7)}

RelevanceTrafficDirection ::= ENUMERATED {allTrafficDirections(0), upstreamTraffic(1),
downstreamTraffic(2), oppositeTraffic(3)}

TransmissionInterval ::= INTEGER {oneMilliSecond(1), tenSeconds(10000)} (1..10000)

ValidityDuration ::=    INTEGER {timeOfDetection(0), oneSecondAfterDetection(1)} (0..86400)

ActionID ::= SEQUENCE {
    originatingStationID StationID,
    sequenceNumber SequenceNumber
}

ItineraryPath ::= SEQUENCE SIZE(1..40) OF ReferencePosition

ProtectedCommunicationZone ::= SEQUENCE {
    protectedZoneType       ProtectedZoneType,
```

```
    expiryTime TimestampIts OPTIONAL,
    protectedZoneLatitude   Latitude,
    protectedZoneLongitude  Longitude,
    protectedZoneRadius ProtectedZoneRadius OPTIONAL,
    protectedZoneID ProtectedZoneID OPTIONAL,
        ...
}

Traces ::= SEQUENCE SIZE(1..7) OF PathHistory

NumberOfOccupants ::= INTEGER {oneOccupant (1), unavailable(127)} (0 .. 127)

SequenceNumber ::=  INTEGER (0..65535)

PositionOfPillars ::= SEQUENCE (SIZE(1..3, ...)) OF PosPillar

RestrictedTypes ::= SEQUENCE (SIZE(1..3, ...)) OF StationType

EventHistory::= SEQUENCE (SIZE(1..23)) OF EventPoint

EventPoint ::= SEQUENCE {
    eventPosition DeltaReferencePosition,
    eventDeltaTime PathDeltaTime OPTIONAL,
    informationQuality InformationQuality
}

ProtectedCommunicationZonesRSU ::= SEQUENCE (SIZE(1..16)) OF ProtectedCommunicationZone



CenDsrcTollingZone ::= SEQUENCE {
    protectedZoneLatitude Latitude,
    protectedZoneLongitude Longitude,
    cenDsrcTollingZoneID CenDsrcTollingZoneID OPTIONAL,
        ...
}

ProtectedZoneRadius ::= INTEGER {oneMeter(1)} (1..255,...)

ProtectedZoneID ::= INTEGER (0.. 134217727)

CenDsrcTollingZoneID ::= ProtectedZoneID

DigitalMap ::= SEQUENCE (SIZE(1..256)) OF ReferencePosition

OpeningDaysHours ::= UTF8String

PhoneNumber ::= NumericString (SIZE(1..16))

END
```

Annex C (informative): Bibliography

ISO/DTS 18234-9: "Intelligent transport systems -- Traffic and travel information via transport protocol expert group (TPEG) data-streams -- Part 9: Traffic Event Compact (TPEG-TEC)".

DATEX II v2.0 Data Dictionary.

History

Document history		
V1.1.1	August 2013	Publication
V1.2.1	September 2014	Publication
V1.3.1	August 2018	Publication