



ITS Connect Systems

**Inter-vehicle Communication Message
Specifications**

ITS Connect TD-001 Ver.1.0

English Translation

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ITS Connect Promotion Consortium

General Notes

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Revision History

[illegible]

ITS Connect Systems Inter-vehicle Communication Message Specifications

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Chapter 1 Overview

This document describes the message format to be commonly used in a system (or a service) for inter-vehicle communications that provides driving safety assistance with wireless communication. This document defines specifications for the message format and its configuration data (data frames, data elements) for inter-vehicle communications.

Chapter 2 Reference Materials

The following documents, in whole or in part, are normatively referenced in this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document applies. The document indicated as a cited reference is cited in this document.

- [1] ASV-4 Project Basic Design Specifications for Communication Based Implementation Systems (2011)
- [2] SAE J2735_200911 Dedicated short range communication (DSRC) message set dictionary (2009)
- [3] ETSI TS 102 637-2 Intelligent Transport Systems (ITS) Vehicular Communications Basic Set of Applications Part 3: Specifications of Cooperative Awareness Basic Service (2013)
- [4] ETSI TS 102 894-2 Intelligent Transport Systems (ITS) Users and Applications Requirements Part 2: Applications and Facilities Layer Common Data Dictionary (2013)
- [5] ARIB STD-T109 700MHz Band Intelligent Transport Systems Standard
- [6] ITS FORUM RC-010 700MHz Band Intelligent Transport Systems - Extended Functions Guideline
- [7] ITS FORUM RC-013 700MHz Band Intelligent Transport Systems - Experimental Guideline for Inter-vehicle Communication Messages (2014, cited references)
- [8] ITS Connect TD-002 ITS Connect Systems - Communication Parameter Specifications
- [9] ITS Connect RE503 ITS Connect Systems - Guideline for the Individual Service Standard ID

Chapter 3 Terms and Abbreviations

Data frame (DF): Unit for message configuration data. Consists of one or more data elements. May also consists of multiple data frames or data elements.

Data element (DE): Smallest unit for message configuration data.

Common service standard: A standard for a service (service system) defined by a standards/specifications developing organization (SDO) or similar.

Individual service standard: A standard for a service (service system) defined by a private company or a specific alliance or similar.

Individual application: Application software operating according to a private service standard.

ASN.1: Abstract Syntax Notation 1

Chapter 4 Messages

4.1. Application scope

Application data exchanged between the application (or the facility layer) and the communication protocol stack are called messages. This guideline applies to messages used for inter-vehicle communications. The relationship between the layer structure and messages is shown in Figure 4–1. Roadside-to-vehicle communication messages as well as other data exchanged between the same layers are outside the scope of this guideline.

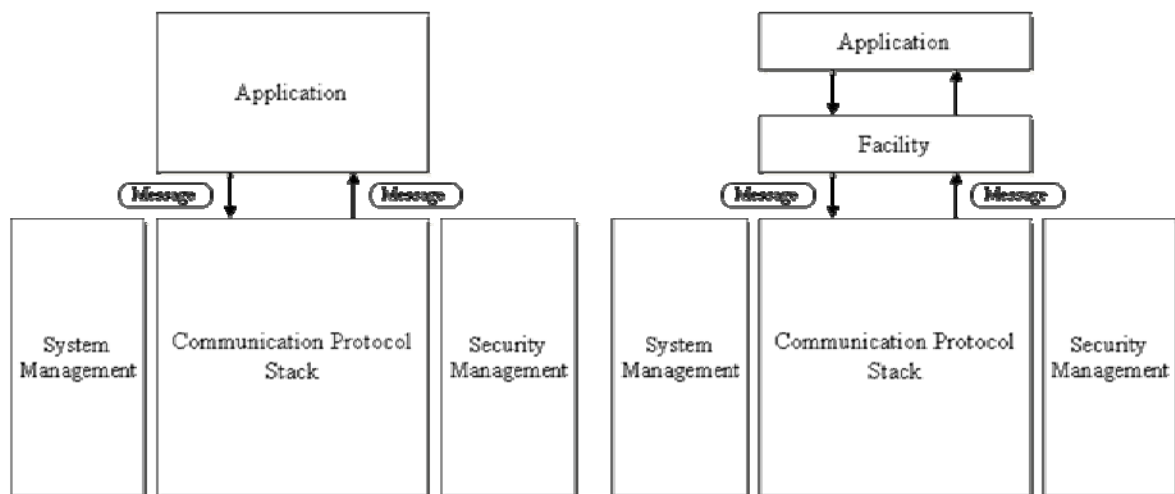


Figure 4–1 Relationship between layer structure and messages

The communication protocol when applying the 700 MHz Band Intelligent Transport Systems Standard ARIB STD–T109 and the Extended Functions Guideline ITS FORUM RC–010 is as follows. The relationship between the layer structure and messages in this case is shown in Figure 4–2. One of the parameters of the EL–MobileStationBroadcastData primitive exchanged by EL – SAP (Extended Layer – Service Access Point) between the application (or facility layer) and the EL (Extended Layer) is ApplicationData, which corresponds to messages handled by the onboard unit. An inter-vehicle communication message is defined as one of these messages. For details on primitive parameters other than ApplicationData, refer to Reference [5], [6] and [8].

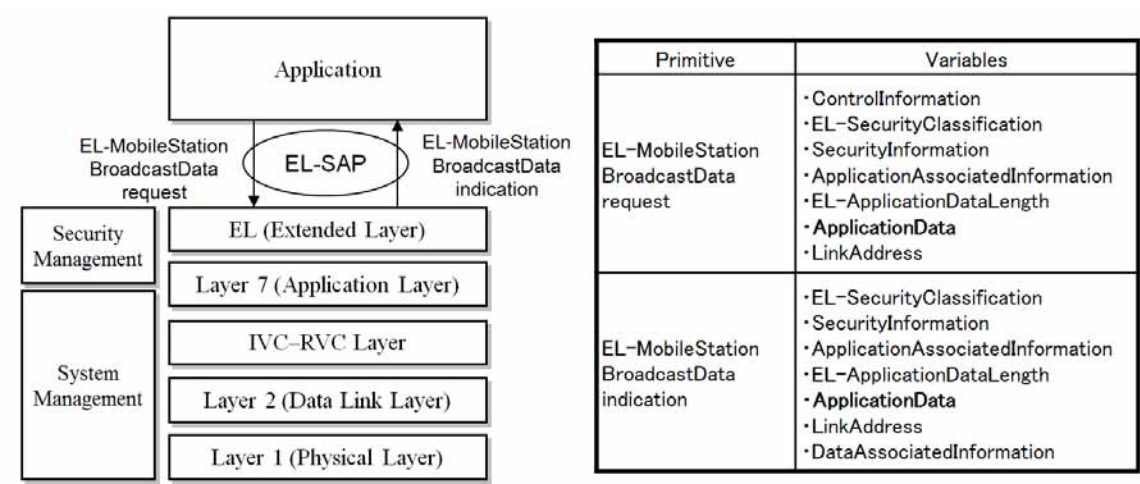


Figure 4-2 Relationship between messages in 700 MHz Band Intelligent Transport Systems

4.2. Message overview

Messages for inter-vehicle communications as specified in this guideline are of one type only, called Basic Message. The Basic Message is a common message sent from all onboard units. It includes basic information intended to support driving safety. All information items specified as mandatory in this guideline must be included in the basic information. In addition, the Basic Message may contain other information (such as information to be optionally used by an individual service or a specific onboard unit), provided unless the maximum message size is exceeded.

4.3. Configuration of Basic Message

The configuration of the Basic Message is shown in Table 4-1. The Basic Message is divided into two main sections, namely the common field from the top, followed by a free field. The common field shall be in the Basic Message sent from all onboard units, and the free field are optional. The common field is divided into the common application header field and the common application data field. The free field is divided into the free application header field and free application data field. Data frames (DF) are set in each header field and data field. In the common application header field, management information about the common application data field is set as DF_CommonFieldManagementInformation. In the common application data field, the driving safety assistance data frames (DF_TimeInformation, DF_PositionInformation, DF_VehicleStatusInformation and DF_VehicleAttributeInformation) are set. The values of these data frames shall be set. If no proper value is available, the "unavailable" value

should be set. The common application data field also holds the data frames (DF_PositionOptionalInformation, DF_GNSSStatusOptionalInformation, DF_PositionAcquisitionOptionalInformation, DF_VehicleStatusOptionalInformation, DF_IntersectionInformation, and DF_ExtendedInformation). These data frames are optional. The sequence for setting the frames when they are to be used is as shown in Table 4–1. In the free application header field, management information about the free field is set as DF_FreeFieldManagementInformation, and information about individual application data in the free application data field is set as the DF_IndividualAppDataManagementInformationSet. The free application data field holds individual application data. The number of individual application data and its storage location, data size etc. are as specified by DF_FreeFieldManagementInformation and DF_IndividualAppDataManagementInformationSet. The data format for individual application data depends on the application specifications and is not defined in this guideline.

Table 4–1 Configuration of Basic Message

Field	Data structure	DF	Size (bytes)		Remarks
Common field	Common application header field	DF_CommonFieldManagementInformation	8		Mandatory
	Common application data field	DF_TimeInformation	4	28	Mandatory. If no proper value is available, set the "unavailable" value.
		DF_PositionInformation	11		
		DF_VehicleStatusInformation	9		
		DF_VehicleAttributeInformation	4		
		DF_PositionOptional Information (*)	2	0 to 26	Optional. Setting sequence may not be changed.
		DF_GNSSStatusOptional Information (*)	4		
		DF_PositionAcquisitionOptional Information (*)	2		
		DF_VehicleStatusOptional Information (*)	7		
		DF_IntersectionInformation (*)	10		
	DF_ExtendedInformation (*)	1			
Free field	Free application header field	DF_FreeFieldManagement Information	0 to 1	0 to 22	Optional. Size depends on number of individual application data set.
		DF_IndividualAppData ManagementInformationSet	0 to 21		
	Free application data field	(Not specified)	0 to 60		Optional. Setting sequence as specified by DF_IndividualAppDataManagementInformationSet.
			Total 36 to 100	(*): Optional information	

The following notation of the Basic Message configuration follows ASN.1. This ASN.1 representation is for convenience of this document interpretation and reference only.

Encoding or decoding processing of the ASN.1 format is not implemented. With the same purpose ASN.1 representations of data elements are in Chapter 5 and in Chapter 6.

ASN.1 Representation:

```
BasicMessage ::= SEQUENCE{
    comFieldInfo      CommonFieldManagementInformation,
    timeInfo          TimeInformation,
    posInfo           PositionInformation,
    vStatInfo         VehicleStatusInformation,
    vAttribInfo       VehicleAttributeInformation,
    posOptInfo        PositionOptionalInformation      OPTIONAL,
    gnssStatOptInfo   GNSSStatusOptionalInformation  OPTIONAL,
    posAcquOptInfo    PositionAcquisitionOptionalInformation OPTIONAL,
    vStatOptInfo      VehicleStatusOptionalInformation OPTIONAL,
    intersectInfo     IntersectionInformation          OPTIONAL,
    extInfo           ExtendedInformation              OPTIONAL,
    freeFieldInfo     FreeFieldManagementInformation  OPTIONAL,
    indivAppDataInfoSet IndividualAppDataManagementInformationSet OPTIONAL,
    indivAppData(#1)  OCTET STRING(SIZE(0..X))        OPTIONAL,
    ...
    indivAppData(#N)  OCTET STRING(SIZE(0..X))        OPTIONAL
}
```

4.4. Storage rules

The following rules apply to the setting of data frames and data elements.

- (1) For all mandatory data elements in data frames that must be set, it is assumed that proper values are set. In other words, the onboard unit is mandated to have such a configuration and functionality that values can be set in all mandatory data elements. If no proper value is available, the "unavailable" value shall be set.
- (2) Regarding optional data elements in mandatory data frames, if the configuration and functionality of the onboard unit do not support the setting of the respective values, the "unavailable" value shall be set, as in the case where no proper value is available.
- (3) For optional data frames (optional information in common field, and free field), data frame setting shall be in data frame units. If the configuration and functionality of the onboard unit do not support the setting of values for one or all such data elements, the "unavailable" value shall be set, as in the case where no proper value is available.
- (4) Signed numeric values such as integer type that are negative shall be

expressed in two's complement representation.

- (5) The first bit of each data element value shall be MSB and the endian shall be big-endian.

4.5. Extension and change rules

The rules that will apply for the future extension and change with version up of the message specifications are described below.

- (1) The order, size, and bit configuration of data frames and data elements already decided in a previous version shall not be changed also in the new version. For example, if the bit configuration of an existing data element is to be changed, the previous data element shall be retained with its existing bit configuration, and a new data element shall be added, following the rules given in (2).
- (2) When adding common field data frames or data elements, these shall be added sequentially in front of the free field. For example, even if a new data element is to be categorized as part of an existing data frame, it shall not be added to an existing data frame but shall be created as a new one before the free field. When adding a new optional data frame (common field option information), the extended option flag of DE_OptionFlag shall be enabled. In addition, a new DE_OptionFlag shall be defined and the new data frame shall then be added.

When a version up of the common field results in an increase of its allocated data size, the existent individual application data may no longer fit in the free field size. Therefore, any extension shall require 30 bytes minimum of the free field and it shall be done within 70 byte common field.

Chapter 5 Data Frames

This chapter describes the data frames that make up the Basic Message.

5.1. Common application header field

This section describes the configuration of the data frames that are set in the common application header field.

5.1.1. DF_CommonFieldManagementInformation

DF_CommonFieldManagementInformation provides basic management information for data set in the common field. This information shall be stored. The configuration of DF_CommonFieldManagementInformation is shown in Table 5–1. The data format of the common field, ID information for message type identification, and version information are set in the DE_CommonServiceStandardID, DE_MessageID, and DE_Version respectively. ID information for the transmitting vehicle is set in the DE_VehicleID, and message transmission sequence number information is set in the DE_IncrementCounter. Size information for the common application data field is indicated by the DE_CommonAppDataLength, and information about whether optional information is set or not is indicated by the DE_OptionFlag. The total data size is 8 bytes (= 64 bits).

Table 5–1 Configuration of DF_CommonFieldManagementInformation

Data Frame/Data Element	Size	Remarks
DF_CommonFieldManagementInformation	64 bits	Mandatory
DE_CommonServiceStandardID	3 bits	Mandatory
DE_MessageID	2 bits	Mandatory
DE_Version	3 bits	Mandatory
DE_VehicleID	32 bits	Mandatory
DE_IncrementCounter	8 bits	Mandatory
DE_CommonAppDataLength	8 bits	Mandatory
DE_OptionFlag	8 bits	Mandatory

ASN.1 Representation:

```
CommonFieldManagementInformation ::= SEQUENCE{
    comServStdID      CommonServiceStandardID,
    msgID             MessageID,
    ver               Version,
    vID               VehicleID,
    increCount        IncrementCounter,
    comAppDataLen     CommonAppDataLength,
    optFlg            OptionFlag
}
```

5.2. Common application data field

This section describes the configuration of the data frames that are set in the common application data field.

5.2.1. DF_TimeInformation

The DF_TimeInformation indicates the time when the content of the transmitted message was finalized. This is a mandatory data frame. The configuration of DF_TimeInformation is shown in Table 5–2. The DE_LeapSecondsCorrectionAvailability indicates whether a leap second correction function is used. The DE_Hour, DE_Minute, and DE_Second indicates the exact time of the content of the transmitting message is finalized. (For seconds, the unit is milliseconds.) The total data size is 4 bytes (= 32 bits).

Table 5–2 Configuration of DF_TimeInformation

Data Frame/Data Element	Size	Remarks
DF_TimeInformation	32 bits	Mandatory
DE_LeapSecondsCorrectionAvailability	1 bit	Mandatory
DE_Hour	7 bits	Mandatory. UTC "Hours" + 9 hours
DE_Minute	8 bits	Mandatory. UTC "Minutes"
DE_Second	16 bits	Mandatory. UTC "Milliseconds"


```

ASN.1 Representation:
TimeInformation ::= SEQUENCE{
    tLeap      LeapSecondsCorrectionAvailability,
    tHour      Hour,
    tMin       Minute,
    tSec       Second
}

```

5.2.2. DF_PositionInformation

The DF_PositionInformation indicates vehicle location information and its confidence information. This is a mandatory data frame. The configuration of DF_PositionInformation is shown in Table 5–3. Position information obtained from a GNSS or similar is set in DE_Latitude, DE_Longitude, and DE_Elevation. Information about the positioning system used to obtain the location information is set in the DE_PositionConfidence and DE_ElevationConfidence. The total data size is 11 bytes (= 88 bits). In case of an equipment configuration that does not support obtaining data for DE_Elevation and DE_ElevationConfidence, the "unavailable" value shall be set for these.

Table 5–3 Configuration of DF_PositionInformation

Data Frame/Data Element	Size	Remarks
DF_PositionInformation	88 bits	Mandatory
DE_Latitude	32 bits	Mandatory
DE_Longitude	32 bits	Mandatory
DE_Elevation	16 bits	
DE_PositionConfidence	4 bits	Mandatory
DE_ElevationConfidence	4 bits	

```

ASN.1 Representation:
PositionInformation ::= SEQUENCE{
    lat      Latitude,
    long     Longitude,
    elev     Elevation          OPTIONAL,
    posConf  PositionConfidence,
    eleConf  ElevationConfidence  OPTIONAL
}

```

5.2.3. DF_VehicleStatusInformation

The DF_VehicleStatusInformation provides information about the vehicle such as its speed and heading. This is a mandatory data frame. The configuration of

DF_VehicleStatusInformation is shown in Table 5–4. Information about vehicle speed, vehicle heading, and longitudinal acceleration is set in the DE_Speed, DE_Heading, and DE_Acceleration respectively. Information about the onboard sensors used to obtain the former data is set in the DE_SpeedConfidence, DE_HeadingConfidence, and DE_AccelerationConfidence. Information about transmission position and steering wheel angle is set in the DE_TransmissionState and DE_SteeringWheelAngle respectively. The total data size is 9 bytes (= 72 bits). In case of an equipment configuration that does not support obtaining data for DE_TransmissionState and DE_SteeringWheelAngle, the "unavailable" value shall be set for these data elements.

Table 5–4 Configuration of DF_VehicleStatusInformation

Data Frame/Data Element	Size	Remarks
DF_VehicleStatusInformation	72 bits	Mandatory
DE_Speed	16 bits	Mandatory
DE_Heading	16 bits	Mandatory
DE_Acceleration	16 bits	Mandatory
DE_SpeedConfidence	3 bits	Mandatory
DE_HeadingConfidence	3 bits	Mandatory
DE_AccelerationConfidence	3 bits	Mandatory
DE_TransmissionState	3 bits	
DE_SteeringWheelAngle	12 bits	

ASN.1 Representation:

```
VehicleStatusInformation ::= SEQUENCE{
    speed          Speed,
    head           Heading,
    accel          Acceleration,
    speedConf      SpeedConfidence,
    headConf       HeadingConfidence,
    accelConf      AccelerationConfidence,
    transStat      TransmissionState          OPTIONAL,
    steerAngle     SteeringWheelAngle        OPTIONAL
}
```

5.2.4. DF_VehicleAttributeInformation

The DF_VehicleAttributeInformation provides information about the vehicle such as type and size. This is a mandatory data frame. The configuration of DF_VehicleAttributeInformation is shown in Table 5–5. The DE_VehicleSizeClassification sets information about the vehicle type, such as large

vehicle, normal size vehicle, motorcycle, etc. The DE_VehicleRoleClassification sets information about the use of the vehicle, such as private vehicle, emergency vehicle, road work vehicle, etc. The DE_VehicleWidth and DE_VehicleLength set information about the vehicle overall width and overall length respectively. The total data size is 4 bytes (= 32 bits). In case of an equipment configuration that does not support obtaining data for DE_VehicleWidth and DE_VehicleLength, the "unavailable" value shall be set for these data elements.

Table 5–5 Configuration of DF_VehicleAttributeInformation

Data Frame/Data Element	Size	Remarks
DF_VehicleAttributeInformation	32 bits	Mandatory
DE_VehicleSizeClassification	4 bits	Mandatory
DE_VehicleRoleClassification	4 bits	Mandatory
DE_VehicleWidth	10 bits	
DE_VehicleLength	14 bits	

ASN.1 Representation:

```
VehicleAttributeInformation ::= SEQUENCE{
  vSizeClass    VehicleSizeClassification,
  vRoleClass    VehicleRoleClassification,
  vWid          VehicleWidth                OPTIONAL,
  vLen          VehicleLength                OPTIONAL
}
```

5.2.5. DF_PositionOptionalInformation

The DF_PositionOptionalInformation is designed for setting detailed or additional information pertaining to the DF_PositionInformation. This data frame is optional. The configuration of DF_PositionOptionalInformation is shown in Table 5–6. The DE_PositionDelay sets the update interval of position measurement data, and the DE_RevisionCounter sets the number of frames with identical data since the GNSS reception time point. The DE_RoadFacilities sets information such as whether the vehicle is currently driving on the road or is in a rest area. The DE_RoadClassification sets information such as whether the road on which the vehicle is driving is an express way, a national/prefectural road etc. The total data size is 2 bytes (= 16 bits). Setting of DF_PositionOptionalInformation is optional, but if used, values for all four data elements must be set in the prescribed order. In case of an equipment configuration that does not support obtaining data for a data element, the "unavailable" value shall be set for that data element.

Table 5–6 Configuration of DF_PositionOptionalInformation

Data Frame/Data Element	Size	Remarks
DF_PositionOptionalInformation	16 bits	Optional
DE_PositionDelay	5 bits	
DE_RevisionCounter	5 bits	
DE_RoadFacilities	3 bits	
DE_RoadClassification	3 bits	

ASN.1 Representation:

```

PositionOptionalInformation ::= SEQUENCE{
    posDelay      PositionDelay,
    revCount      RevisionCounter,
    roadFacil     RoadFacilities,
    roadClass     RoadClassification,
}

```

5.2.6. DF_GNSSStatusOptionalInformation

The DF_GNSSStatusOptionalInformation is designed for setting detailed or additional information pertaining to the DF_PositionInformation. This data frame is optional. The configuration of DF_GNSSStatusOptionalInformation is shown in Table 5–7. Three data elements indicating the reliability index (horizontal error ellipse) of the position information obtained from the GNSS are available: DE_SemiMajorAxisOfPositionalErrorEllipse, DE_SemiMinorAxisOfPositionalErrorEllipse, and DE_SemiMajorAxisOrientationOfPositionalErrorEllipse. The total data size is 4 bytes (= 32 bits). Setting of DF_GNSSStatusOptionalInformation is optional, but if used, values for all three data elements must be set in the prescribed order. In case of an equipment configuration that does not support obtaining data for a data element, the "unavailable" value shall be set for that data element.

Table 5–7 Configuration of DF_GNSSStatusOptionalInformation

Data Frame/Data Element	Size	Remarks
DF_GNSSStatusOptionalInformation	32 bits	Optional
DE_SemiMajorAxisOfPositionalErrorEllipse	8 bits	
DE_SemiMinorAxisOfPositionalErrorEllipse	8 bits	
DE_SemiMajorAxisOrientationOfPositionalErrorEllipse	16 bits	

ASN.1 Representation:

```

GNSSStatusOptionalInformation ::= SEQUENCE{
    majorAxis      SemiMajorAxisOfPositionalErrorEllipse,
    minorAxis      SemiMinorAxisOfPositionalErrorEllipse,
    axisOrien      SemiMajorAxisOrientationOfPositionalErrorEllipse,
}

```

5.2.7. DF_PositionAcquisitionOptionalInformation

The DF_PositionAcquisitionOptionalInformation is designed for setting detailed or additional information pertaining to the DF_PositionInformation. This data frame is optional. The configuration of DF_PositionAcquisitionOptionalInformation is shown in Table 5–8. Three data elements for status information are available: DE_GNSSPositioningMode for positioning dimension information, DE_GNSSPDOP for positional dilution of precision, and DE_NumberOfGNSSSatellitesInUse for number of satellites being tracked. In addition, three data elements for information about positioning related functions are available: DE_GNSSMultiPathDetection for GNSS multipath detection information, DE_DeadReckoningAvailability for indicating the presence/absence of a dead reckoning function, and DE_MapMatchingAvailability for indicating the presence/absence of a map matching function. The total data size is 2 bytes (= 16 bits). Setting of DF_PositionAcquisitionOptionalInformation is optional, but if used, values for all six data elements must be set in the prescribed order. In case of an equipment configuration that does not support obtaining data for a data element, the "unavailable" value shall be set for that data element.

Table 5–8 Configuration of DF_PositionAcquisitionOptionalInformation

Data Frame/Data Element	Size	Remarks
DF_PositionAcquisitionOptionalInformation	16 bits	Optional
DE_GNSSPositioningMode	2 bits	
DE_GNSSPDOP	6 bits	
DE_NumberOfGNSSSatellitesInUse	4 bits	
DE_GNSSMultiPathDetection	2 bits	
DE_DeadReckoningAvailability	1 bit	
DE_MapMatchingAvailability	1 bit	

ASN.1 Representation:

```
PositionAcquisitionOptionalInformation ::= SEQUENCE{  
    gnssPosMode      GNSSPositioningMode,  
    gnssPDOP         GNSSPDOP,  
    numGNSSSat       NumberOfGNSSSatellitesInUse,  
    gnssMPath        GNSSMultiPathDetection,  
    dRAvail          DeadReckoningAvailability,  
    mapMatAvail      MapMatchingAvailability  
}
```

5.2.8. DF_VehicleStatusOptionalInformation

The DF_VehicleStatusOptionalInformation is designed for setting additional information pertaining to the DF_VehicleStatusInformation. This data frame is optional. The configuration of DF_VehicleStatusOptionalInformation is shown in Table 5–9. The DE_YawRate indicates the angular velocity versus the turning direction, DE_BrakeAppliedStatus indicates the brake status, DE_AuxiliaryBrakeAppliedStatus indicates the auxiliary brake status, and DE_ThrottlePosition indicates the accelerator pedal position. Information about the headlights and turn lights is set to the DE_ExteriorLights. The operation condition of an adaptive cruise control (ACC) or other control systems in the vehicle set in a total of eight data elements starting with DE_AdaptiveCruiseControlStatus. The total data size is 7 bytes (= 56 bits). Setting of DF_VehicleStatusOptionalInformation is optional, but if used, values for all 13 data elements must be set in the prescribed order. In case of an equipment configuration that does not support obtaining data for a data element, the "unavailable" value shall be set for that data element.

Table 5–9 Configuration of DF_VehicleStatusOptionalInformation

Data Frame/Data Element	Size	Remarks
DF_VehicleStatusOptionalInformation	56 bits	Optional
DE_YawRate	16 bits	
DE_BrakeAppliedStatus	6 bits	
DE_AuxiliaryBrakeAppliedStatus	2 bits	
DE_ThrottlePosition	8 bits	
DE_ExteriorLights	8 bits	
DE_AdaptiveCruiseControlStatus	2 bits	ACC is the abbreviation of Adaptive Cruise Control System
DE_CooperativeAdaptiveCruiseControlStatus	2 bits	C-ACC is the abbreviation of Cooperative Adaptive Cruise Control System
DE_PreCrashSafetyStatus	2 bits	PCS is the abbreviation of Pre-Crash Safety System
DE_AntilockBrakeStatus	2 bits	ABS is the abbreviation of Antilock Brake System
DE_TractionControlStatus	2 bits	TRC is the abbreviation of Traction Control System
DE_ElectronicStabilityControlStatus	2 bits	ESC is the abbreviation of Electronic Stability Control System
DE_LaneKeepingAssistStatus	2 bits	LKA is the abbreviation of Lane Keeping Assist System
DE_LaneDepartureWarningStatus	2 bits	LDW is the abbreviation of Lane Departure Warning System

ASN.1 Representation:

```

VehicleStatusOptionalInformation ::= SEQUENCE{
    yaw                YawRate,
    brakeStat          BrakeAppliedStatus,
    auxBrakeStat        AuxiliaryBrakeAppliedStatus,
    throtPos            ThrottlePosition,
    extLight            ExteriorLights,
    aCCStat             AdaptiveCruiseControlStatus,
    cACCStat            CooperativeAdaptiveCruiseControlStatus,
    pCSStat             PreCrashSafetyStatus,
    aBSStat             AntilockBrakeStatus,
    tRCStat             TractionControlStatus,
    eSCStat             ElectronicStabilityControlStatus,
    lKASat              LaneKeepingAssistStatus,
    lDWSat              LaneDepartureWarningStatus
}

```

5.2.9. DF_IntersectionInformation

The DF_IntersectionInformation is designed for setting information pertaining to an upcoming intersection in the forward direction. This data frame is optional. The configuration of DF_IntersectionInformation is shown in Table 5–10. The DE_IntersectionDistanceInformationAvailability and DE_IntersectionDistance set information about the distance acquiry source and the distance to the intersection respectively. The DE_IntersectionPositionInformationAvailability, DE_IntersectionLatitude, and DE_IntersectionLongitude set information about the position acquiry source and the latitude and longitude of the intersection respectively. The total data size is 10 bytes (= 80 bits). Setting of DF_IntersectionInformation is optional, but if used, values for all five data elements must be set in the prescribed order. In case of an equipment configuration that does not support obtaining data for a data element, the "unavailable" value shall be set for that data element.

Table 5–10 Configuration of DF_IntersectionInformation

Data Frame/Data Element	Size	Remarks
DF_IntersectionInformation	80bits	Optional
DE_IntersectionDistanceInformationAvailability	3 bits	
DE_IntersectionDistance	10 bits	
DE_IntersectionPositionInformationAvailability	3 bits	
DE_IntersectionLatitude	32 bits	
DE_IntersectionLongitude	32 bits	

ASN.1 Representation:

```

IntersectionInformation ::= SEQUENCE{
    intersectDistAvail    IntersectionDistanceInformationAvailability,
    intersectDist         IntersectionDistance,
    intersectPosAvail     IntersectionPositionInformationAvailability,
    intersectLat          IntersectionLatitude,
    intersectLong         IntersectionLongitude
}

```

5.2.10. DF_ExtendedInformation

The DF_ExtendedInformation is designed for setting information pertaining to the operation status of emergency vehicles, work status of road work vehicles, etc. This data frame is optional. The configuration of DF_ExtendedInformation is shown in Table 5–11. Depending on the DE_VehicleRoleClassification value in the DF_VehicleAttributeInformation, one of the following data elements is set in the DF_ExtendedInformation: DE_ExtendedInformationForPrivateVehicle, DE_ExtendedInformationForEmergencyVehicle, DE_ExtendedInformationForRoadWorkVehicle, DE_ExtendedInformationForPassengerTransportationVehicle, DE_ExtendedInformationForFreightTransportationVehicle, DE_ExtendedInformationForSpecialVehicle, or DE_ExtendedInformationForOthers. The total data size is 1 byte (= 8 bits).

Table 5–11 Configuration of DF_ExtendedInformation

Data Frame/Data Element	Size	Remarks
DF_ExtendedInformation	8 bits	Optional
DE_ExtendedInformationForPrivateVehicle or DE_ExtendedInformationForEmergencyVehicle or DE_ExtendedInformationForRoadWorkVehicle or DE_ExtendedInformationForPassengerTransportationVehicle or DE_ExtendedInformationForFreightTransportationVehicle or DE_ExtendedInformationForSpecialVehicle or DE_ExtendedInformationForOthers	8 bits 8 bits 8 bits 8 bits 8 bits 8 bits 8 bits	Select suitable DE according to DE_VehicleRoleClassification value.

ASN.1 Representation:

```
ExtendedInformation ::= CHOICE{  
    extInfoPrivate      ExtendedInformationForPrivateVehicle,  
    extInfoEmergen      ExtendedInformationForEmergencyVehicle,  
    extInfoRoadWork      ExtendedInformationForRoadWorkVehicle,  
    extInfoPassenTrans   ExtendedInformationForPassengerTransportationVehicle,  
    extInfoFreightTrans  ExtendedInformationForFreightTransportationVehicle,  
    extInfoSpecial       ExtendedInformationForSpecialVehicle,  
    extInfoOther         ExtendedInformationForOthers  
}
```

5.3. Free application header field

This section describes the configuration of the data frames that are set in the free application header field. Setting of the free application header field is optional, but when the free field is used for setting individual application data, the following two data frames must be set.

5.3.1. DF_FreeFieldManagementInformation

DF_FreeFieldManagementInformation provides basic management information for data set in the free field. This data frame is optional. The configuration of DF_FreeFieldManagementInformation is shown in Table 5–12. Information about the size of the free application header field is set in DE_IndividualAppHeaderLength, and the number of individual application data set in the free application data field is set in DE_NumberOfIndividualAppData. The total data size is 1 byte (= 8 bits). Setting of DF_FreeFieldManagementInformation is optional, but if individual application data are set in the free field, this information shall be set.

Table 5–12 Configuration of DF_FreeFieldManagementInformation

Data Frame/Data Element	Size	Remarks
DF_FreeFieldManagementInformation	8 bits	Optional
DE_IndividualAppHeaderLength	5 bits	
DE_NumberOfIndividualAppData	3 bits	

ASN.1 Representation:

```
FreeFieldManagementInformation ::= SEQUENCE{  
    indivAppHeaderLen    IndividualAppHeaderLength,  
    numIndivAppData      NumberOfIndividualAppData  
}
```

5.3.2. DF_IndividualAppDataManagementInformationSet

DF_IndividualAppDataManagementInformationSet is a set of DF_IndividualAppDataManagementInformation. Setting of this data frame is optional. The configuration of DF_IndividualAppDataManagementInformationSet is shown in Table 5–13. A DF_IndividualAppDataManagementInformationSet consists of one or more DF_IndividualAppDataManagementInformation. The data size of one DF_IndividualAppDataManagementInformation frame is 3 bytes (= 24 bits). The number of frames is determined by the number N of individual application data set in the free application data field. Therefore the data size of the DF_IndividualAppDataManagementInformationSet is 3 x N bytes (= 24 x N bits). The value of N is set in the DE_NumberOfIndividualAppData of the DF_FreeFieldManagementInformation. The range is 1 to 7. Setting of DF_IndividualAppDataManagementInformationSet is optional, depending on the presence or absence of DF_IndividualAppDataManagementInformation.

Table 5–13 Configuration of DF_IndividualAppDataManagementInformationSet

Data Frame/Data Element	Size	Remarks
DF_IndividualAppDataManagementInformationSet	24xN bits	Optional
DF_IndividualAppDataManagementInformation(#1)	24 bits	
DF_IndividualAppDataManagementInformation(#2)	24 bits	
. . .		
DF_IndividualAppDataManagementInformation(#N)	24 bits	

ASN.1 Representation:

IndividualAppDataManagementInformationSet ::= SEQUENCE(SIZE(1..7)) OF IndividualAppDataManagementInformation

5.3.3. DF_IndividualAppDataManagementInformation

DF_IndividualAppDataManagementInformation provides basic management information for individual application data set in the free application data field. This data frame is optional. The configuration of DF_IndividualAppDataManagementInformation is shown in Table 5–14. ID information for identification of the data format of the individual application data is set in the DE_IndividualServiceStandardID. Information indicating the storage location of individual application data in the free application data field is set in the DE_IndividualAppDataAddress and the DE_IndividualAppDataLength. The data size is 3 bytes (= 24 bits). Setting of DF_IndividualAppDataManagementInformation is

optional, but if individual application data are set in the free field, this information shall be set.

Table 5–14 Configuration of DF_IndividualAppDataManagementInformation

Data Frame/Data Element	Size	Remarks
DF_IndividualAppDataManagementInformation	24 bits	Optional
DE_IndividualServiceStandardID	8 bits	
DE_IndividualAppDataAddress	8 bits	
DE_IndividualAppDataLength	8 bits	

ASN.1 Representation:

```
IndividualAppDataManagementInformation ::= SEQUENCE{
    indivServStdID      IndividualServiceStandardID,
    indivAppDataAddress IndividualAppDataAddress,
    indivAppDataLen     IndividualAppDataLength
}
```

5.4. Free application data field

The data frames set in the free application data field depend on the specifications of the respective individual applications and are therefore not defined in this guideline. However, the storage sequence of individual application data depends on the storage sequence in which DF_IndividualAppDataManagementInformation are set in the DF_IndividualAppDataManagementInformationSet in the free application header field, and the size of application data for each individual application depends on the DE_IndividualAppDataLength in the corresponding DF_IndividualAppDataManagementInformation. No upper limit is specified for the size of data set in the free application data field, but the total size together with other fields may not exceed 100 bytes. Setting of data in the free application data field is optional, but when individual application data are set, the free application header field shall be set. The configuration of the free application data field is shown in Table 5–15.

Table 5–15 Configuration of free application data field

Data Frame/Data Element	Size	Remarks
Individual application data (#1)	Not specified	Not specified.
Individual application data (#2)	Not specified	Not specified.
. . .	. . .	. . .
Individual application data (#N)	Not specified	Not specified.

Chapter 6 Data Elements

This chapter describes the various data elements that make up the data frames.

6.1. DF_CommonFieldManagementInformation

Definitions for each of the data elements that make up the DF_CommonFieldManagementInformation are given below.

6.1.1. DE_CommonServiceStandardID

No.	1–1
Data name	DE_CommonServiceStandardID
Definition	ID information for common service standard (standard supported by this message). This ID is defined by Reference [8]. For inter-vehicle communications common service standard, set the value to 1.
Data size	3 bits
Date type	Enumerated
Allocation	Refer to Reference [8]

ASN.1 Representation:

```
CommonServiceStandardID ::= ENUMERATED{
    reserved                (0),
    V2VCommonServiceStandard (1),
    ... -- values 2 to 7 reserved for other service standard
}
```

6.1.2. DE_MessageID

No.	1–2
Data name	DE_MessageID
Definition	ID information for message identification. For inter-vehicle communications Basic Message, set the value to 1.
Data size	2 bits
Date type	Enumerated
Allocation	0: Reserved 1: Basic Message 2 to 3: Reserved

```
ASN.1 Representation:
MessageID ::= ENUMERATED{
    reserved          (0),
    Basic Message     (1),
    reserved          (2),
    reserved          (3)
}
```

6.1.3. DE_Version

No.	1–3
Data name	DE_Version
Definition	Message version information. As current specifications are Version 1, set the value to 1.
Data size	3 bits
Date type	Enumerated
Allocation	0: Reserved 1: Version 1 2 to 7: Reserved

```
ASN.1 Representation:
Version ::= ENUMERATED{
    reserved    (0),
    version1    (1),
    ... -- values 2 to 7 reserved
}
```

6.1.4. DE_VehicleID

No.	1–4
Data name	DE_VehicleID
Definition	Temporary ID information for individual vehicle. Automatically set to a random value when onboard unit powers up.
Data size	32 bits
Date type	Unsigned integer
Expression range	0 to 4,294,967,295
Resolution	1

```
ASN.1 Representation:
VehicleID ::= INTEGER(0..4294967295)
```

6.1.5. DE_IncrementCounter

No.	1–5
Data name	DE_IncrementCounter
Definition	Counter indicating data transmission sequence. Incremented with each transmission. Reverts back to 0 after 255.
Data size	8 bits
Date type	Unsigned integer
Expression range	0 to 255
Resolution	1

ASN.1 Representation:
IncrementCounter ::= INTEGER(0..255)

6.1.6. DE_CommonAppDataLength

No.	1–6
Data name	DE_CommonAppDataLength
Definition	Data size information for common application data field. The unit is bytes.
Data size	8 bits
Date type	Unsigned integer
Expression range	28 to 54 bytes
Resolution	1 byte
Remarks	The above expression range may be changed if new data elements or data frames are added to the common application data field in case of version upgrading of message specifications.

ASN.1 Representation:
CommonAppDataLength ::= INTEGER(0..255)
-- units of 1 byte
-- available range (28..54) in version1

6.1.7. DE_OptionFlag

No.	1–7
Data name	DE_OptionFlag
Definition	Flag for indicating presence of option information. Set option flag bit for applicable option information to 1. When option flag is extended, set extended option flag bit to 1.
Data size	8 bits
Data type	Bit string
Allocation	[0]: DF_PositionOptionalInformationAvailability [1]: DF_GNSSStatusOptionalInformationAvailability [2]: DF_PositionAcquisitionOptionalInformationAvailability [3]: DF_VehicleStatusOptionalInformationAvailability [4]: DF_IntersectionInformationAvailability [5]: DF_ExtendedInformationAvailability [6]: ExtendedOptionalFlagAvailability [7]: FreeFieldAvailability

ASN.1 Representation:

```
OptionFlag ::= BITSTRING{  
    positionOptionalInformationAvailability (0),  
    gnssStatusOptionalInformationAvailability (1),  
    positionAcquisitionOptionalInformationAvailability (2),  
    vehicleStatusOptionalInformationAvailability (3),  
    intersectionInformationAvailability (4),  
    extendedInformationAvailability (5),  
    extendedOptionalFlagAvailability (6),  
    freeFieldAvailability (7)  
}
```


6.2. DF_TimeInformation

Definitions for each of the data elements that make up the DF_TimeInformation are given below.

6.2.1. DE_LeapSecondsCorrectionAvailability

No.	2-1
Data name	DE_LeapSecondsCorrectionAvailability
Definition	Information indicating whether time value reflects leap second correction.
Data size	1 bit
Date type	Boolean
Allocation	0: No correction function available 1: Correction function available

ASN.1 Representation:

LeapSecondsCorrectionAvailability ::= BOOLEAN

-- unavailable (0)
-- available (1)

6.2.2. DE_Hour

No.	2-2
Data name	DE_Hour
Definition	Time (hours) information indicates the exact time of the content of the transmitting message is finalized. Set as UTC hour + 9, based on the time information obtained from GNSS. If time delay correction for GNSS etc. is performed, set the value after correction. If unavailable, set the value to 127 (0x7F).
Data size	7 bits
Date type	Unsigned integer
Expression range	0 to 23 hours
Resolution	1 hour

ASN.1 Representation:

Hour ::= INTEGER(0..127)

-- units of 1 hour
-- available range (0..23)
-- unavailable (127)

6.2.3. DE_Minute

No.	2–3
Data name	DE_Minute
Definition	Time (minutes) information indicates the exact time of the content of the transmitting message is finalized. Set it based on the time information obtained from GNSS. If time delay correction for GNSS etc. is performed, set the value after correction. If unavailable, set the value to 255 (0xFF).
Data size	8 bits
Date type	Unsigned integer
Expression range	0 to 59 minutes
Resolution	1 minute

ASN.1 Representation:
Minute ::= INTEGER(0..255)
-- units of 1 minute
-- available range (0..59)
-- unavailable (255)

6.2.4. DE_Second

No.	2–4
Data name	DE_Second
Definition	Time (seconds) information indicates the exact time of the content of the transmitting message is finalized. Set it based on the time information obtained from GNSS. If time delay correction for GNSS etc. is performed, set the value after correction. If unavailable, set the value to 65535 (0xFFFF).
Data size	16 bits
Date type	Unsigned integer
Expression range	0 to 60.999 seconds
Resolution	0.001 second

ASN.1 Representation:
Second ::= INTEGER(0..65535)
-- units of 1 millisecond
-- available range with leap second (0..60999)
-- unavailable (65535)

6.3. DF_PositionInformation

Definitions for each of the data elements that make up the DF_PositionInformation are given below.

6.3.1. DE_Latitude

No.	3-1
Data name	DE_Latitude
Definition	Position latitude information. Geodetic datum is WGS84 (or equivalent). Positive values indicate north latitude, and negative values indicate south latitude. If unavailable, set the value to -2147483648 (0x80000000).
Data size	32 bits
Date type	Integer
Expression range	-90 to 90 degrees
Resolution	0.0000001 degree

ASN.1 Representation:

Latitude ::= INTEGER(-2147483648..2147483647)

- units of 0.1 micro degree
- available range (-9000000000..9000000000)
- unavailable (-2147483648)

6.3.2. DE_Longitude

No.	3-2
Data name	DE_Longitude
Definition	Position longitude information. Geodetic datum is WGS84 (or equivalent). Positive values indicate east longitude, and negative values indicate west longitude. If unavailable, set the value to -2147483648 (0x80000000).
Data size	32 bits
Date type	Integer
Expression range	-180 to 180 degrees
Resolution	0.0000001 degree

ASN.1 Representation:

Longitude ::= INTEGER(-2147483648..2147483647)

- units of 0.1 micro degree
- available range (-18000000000..18000000000)
- unavailable (-2147483648)

6.3.3. DE_Elevation

No.	3–3
Data name	DE_Elevation
Definition	Elevation information from reference level. Range from -409.5 to -0.1 m is expressed as 0xF001 to 0xFFFF, and range from 0 to 6143.9 m as 0x0000 to 0xEFFF. For elevations above 6143.9 m, set the value to 0xEFFF. If unavailable, set the value to 0xF000.
Data size	16 bits
Data type	Integer
Expression range	-409.5 to 6143.9 m
Resolution	0.1 m

ASN.1 Representation:

Elevation ::= OCTET STRING(SIZE(2))

- units of 0.1m
- encode elevations from 0 to 6143.9 meters
- above the reference ellipsoid as 0x0000 to 0xEFFF
- encode elevations from -409.5 to -0.1 meters
- below the reference ellipsoid as 0xF001 to 0xFFFF
- unavailable as 0xF000

6.3.4. DE_PositionConfidence

No.	3–4
Data name	DE_PositionConfidence
Definition	Information indicating the reliability of horizontal position (DE_Latitude, DE_Longitude) data. Set the value corresponding to the class of the positioning system in use. The value may also be dynamically varied according to the GNSS reception condition etc.
Data size	4 bits
Data type	Enumerated
Allocation	0: Unavailable 1: More than 100 m class 2: 100 m class 3: 75 m class 4: 50 m class 5: 40 m class 6: 30 m class 7: 25 m class 8: 20 m class 9: 15 m class 10: 10 m class 11: 7.5 m class 12: 5 m class 13: 2.5 m class 14: 1 m class 15: 0.1 m or less class

ASN.1 Representation:

```
PositionConfidence ::= ENUMERATED{
    unavailable                (0),
    more than 100m class       (1),
    100m class                  (2),
    75m class                   (3),
    50m class                   (4),
    40m class                   (5),
    30m class                   (6),
    25m class                   (7),
    20m class                   (8),
    15m class                   (9),
    10m class                   (10),
    7.5m class                  (11),
    5m class                    (12),
    2.5m class                  (13),
    1m class                    (14),
    0.1m or less class         (15)
}
```

6.3.5. DE_ElevationConfidence

No.	3–5
Data name	DE_ElevationConfidence
Definition	Information indicating the reliability of elevation (DE_Elevation) data. Set the value corresponding to the class of the elevation measurement system in use. The value may also be dynamically varied according to the GNSS reception condition etc.
Data size	4 bits
Date type	Enumerated
Allocation	0: Unavailable 1: More than 100 m class 2: 100 m class 3: 75 m class 4: 50 m class 5: 40 m class 6: 30 m class 7: 25 m class 8: 20 m class 9: 15 m class 10: 10 m class 11: 7.5 m class 12: 5 m class 13: 2.5 m class 14: 1 m class 15: 0.1 m or less class

ASN.1 Representation:

```
ElevationConfidence ::= ENUMERATED{
    unavailable                (0),
    more than 100m class      (1),
    100m class                 (2),
    75m class                  (3),
    50m class                  (4),
    40m class                  (5),
    30m class                  (6),
    25m class                  (7),
    20m class                  (8),
    15m class                  (9),
    10m class                  (10),
    7.5m class                 (11),
    5m class                   (12),
    2.5m class                 (13),
    1m class                   (14),
    0.1m or less class        (15)
}
```

6.4. DF_VehicleStatusInformation

Definitions for each of the data elements that make up the DF_VehicleStatusInformation are given below.

6.4.1. DE_Speed

No.	4-1
Data name	DE_Speed
Definition	Vehicle velocity information. If unavailable, set the value to 65535 (0xFFFF).
Data size	16 bits
Date type	Unsigned integer
Expression range	0 to 163.83 m/s
Resolution	0.01 m/s

ASN.1 Representation:

```
Speed ::= INTEGER(0..65535)
-- units of 0.01 m/s
-- available range (0..16383)
-- unavailable (65535)
```


6.4.2. DE_Heading

No.	4–2
Data name	DE_Heading
Definition	Information about the direction in which the vehicle is moving. Using due north as 0 degrees, set the value to the angular heading in clockwise direction. If unavailable, set the value to 65535 (0xFFFF).
Data size	16 bits
Date type	Unsigned integer
Expression range	0 to 359.9875 degrees
Resolution	0.0125 degrees

ASN.1 Representation:

Heading ::= INTEGER(0..65535)

- units of 0.0125 degrees from North
- available range (0..28799)
- North (0)
- East (7200)
- South (14400)
- West (21600)
- unavailable (65535)

6.4.3. DE_Acceleration

No.	4–3
Data name	DE_Acceleration
Definition	Information about vehicle acceleration in the longitudinal direction. If unavailable, set the value to –32768 (0x8000).
Data size	16 bits
Date type	Integer
Expression range	–20 to 20 m/s ²
Resolution	0.01 m/s ²

ASN.1 Representation:

Acceleration ::= INTEGER(–32768..32767)

- units of 0.01 m/s²
- available range (–32767..32767)
- unavailable (–32768)

6.4.4. DE_SpeedConfidence

No.	4-4
Data name	DE_SpeedConfidence (DE_SpeedConfidence)
Definition	Information indicating the reliability of vehicle speed (DE_Speed) data. Set the value corresponding to the class of the speed measurement system in use.
Data size	3 bits
Date type	Enumerated
Allocation	0: Unavailable 1: More than 10 m/s class 2: 10 m/s class 3: 5 m/s class 4: 1 m/s class 5: 0.5 m/s class 6: 0.1 m/s class 7: 0.05 m/s or less class

ASN.1 Representation:

```
SpeedConfidence ::= ENUMERATED{
    unavailable          (0),
    more than 10m/s class (1),
    10m/s class          (2),
    5m/s class           (3),
    1m/s class           (4),
    0.5m/s class         (5),
    0.1m/s class         (6),
    0.05m/s or less class (7)
}
```

6.4.5. DE_HeadingConfidence

No.	4–5
Data name	DE_HeadingConfidence
Definition	Information indicating the reliability of vehicle moving (DE_Heading) data. Set the value corresponding to the class of the moving measurement system in use.
Data size	3 bits
Date type	Enumerated
Allocation	0: Unavailable 1: More than 30 degrees class 2: 30 degrees class 3: 20 degrees class 4: 10 degrees class 5: 5 degrees class 6: 1 degree class 7: 0.5 degrees and less class

ASN.1 Representation:

```

HeadingConfidence ::= ENUMERATED{
    unavailable                (0),
    more than 30degrees class  (1),
    30degrees class            (2),
    20degrees class            (3),
    10degrees class            (4),
    5degrees class             (5),
    1degrees class             (6),
    0.5degrees or less class   (7)
}

```

6.4.6. DE_AccelerationConfidence

No.	4–6
Data name	DE_AccelerationConfidence
Definition	Information indicating the reliability of vehicle longitudinal acceleration (DE_Acceleration) data. Set the value corresponding to the class of the longitudinal acceleration measurement system in use.
Data size	3 bits
Date type	Enumerated
Allocation	0: Unavailable 1: More than 5 m/s ² class 2: 5 m/s ² class 3: 2.5 m/s ² class 4: 1 m/s ² class 5: 0.5 m/s ² class 6: 0.1 m/s ² class 7: 0.05 m/s ² or less class

ASN.1 Representation:

```
AccelerationConfidence ::= ENUMERATED{
    unavailable                (0),
    more than 5m/s^2 class    (1),
    5m/s^2 class                (2),
    2.5m/s^2 class            (3),
    1m/s^2 class                (4),
    0.5m/s^2 class            (5),
    0.1m/s^2 class            (6),
    0.05m/s^2 or less class    (7)
}
```

6.4.7. DE_TransmissionState

No.	4–7
Data name	DE_TransmissionState
Definition	Information about the transmission position of the vehicle. For vehicles with manual transmission or with continuously variable transmission, set the "Drive" value for all forward positions.
Data size	3 bits
Date type	Enumerated
Allocation	0: Neutral 1: Parking 2: Forward Gears 3: Reverse Gears 4 to 6: Reserved 7: Unavailable

ASN.1 Representation:

```

TransmissionState ::= ENUMERATED{
    neutral          (0),
    park             (1),
    forwardGears     (2),
    reverseGears     (3),
    reserved         (4),
    reserved         (5),
    reserved         (6),
    unavailable      (7)
}

```

6.4.8. DE_SteeringWheelAngle

No.	4–8
Data name	DE_SteeringWheelAngle
Definition	Information about the steering wheel position of the vehicle. Positive values indicate clockwise rotation. If unavailable, set the value to –2048 (0x800).
Data size	12 bits
Date type	Integer
Expression range	–3070.5 to 3070.5 degrees
Resolution	1.5 degrees

ASN.1 Representation:

SteeringWheelAngle ::= INTEGER(-2048..2047)

-- units of 1.5 degrees

-- available range (-2047..2047)

-- unavailable (-2048)

6.5. DF_VehicleAttributeInformation

Definitions for each of the data elements that make up the DF_VehicleAttributeInformation are given below.

6.5.1. DE_VehicleSizeClassification

No.	5-1
Data name	DE_VehicleSizeClassification
Definition	Information about the vehicle size.
Data size	4 bits
Date type	Enumerated
Allocation	0: Large motor vehicle (incl. special large motor vehicle) 1: Semi-large motor vehicle 2: Normal motor vehicle (incl. small special motor vehicle, light motor vehicle [4-wheeled]) 3: Motorcycle (incl. large motorcycle and motorized bicycle) 4: Bicycle 5: Non-motorized light vehicle (e.g. cart, rickshaw, etc.) 6: Pedestrian (incl. wheelchair and mobility scooter) 7: Tram 8 to 14: Reserved 15: Others, Unknown

ASN.1 Representation:

```

VehicleSizeClassification ::= ENUMERATED{
    large size vehicle      (0),
    semi-large size vehicle (1),
    normal size vehicle     (2),
    motorcycle              (3),
    bicycle                 (4),
    light vehicle           (5), -- without bicycle
    pedestrian              (6),
    tram                    (7),
    -- values 8 to 14 reserved
    others                   (15)
}

```

6.5.2. DE_VehicleRoleClassification

No.	5-2
Data name	DE_VehicleRoleClassification
Definition	Information about the vehicle usage type.
Data size	4 bits
Date type	Enumerated
Allocation	0: Private vehicle 1: Emergency vehicle 2: Road work vehicle 3: Passenger transportation vehicle 4: Freight transportation vehicle 5: Special vehicle (excl. road work vehicle) 6 to 14: Reserved 15: Other, Unknown

ASN.1 Representation:

```

VehicleRoleClassification ::= ENUMERATED{
    private vehicle          (0),
    emergency vehicle        (1),
    road work vehicle        (2),
    passenger transportation vehicle (3),
    freight transportation vehicle (4),
    special vehicle          (5), -- without road work vehicle
    -- values 6 to 14 reserved
    others                   (15)
}

```

6.5.3. DE_VehicleWidth

No.	5–3
Data name	DE_VehicleWidth
Definition	Information about the overall width of the vehicle. For pedestrians or vehicles with unknown width, set the value to 1023 (0x3FF).
Data size	10 bits
Date type	Unsigned integer
Expression range	0.01 to 10.22 m
Resolution	0.01 m

ASN.1 Representation:
VehicleWidth ::= INTEGER(0..1023)
-- units of 0.01m
-- available range (1..1022)
-- unavailable (1023)

6.5.4. DE_VehicleLength

No.	5–4
Data name	DE_VehicleLength
Definition	Information about the overall length of the vehicle. For pedestrians or vehicles with unknown length, set the value to 16383 (0x3FFF).
Data size	14 bits
Date type	Unsigned integer
Expression range	0.01 to 163.82 m
Resolution	0.01 m

ASN.1 Representation:
VehicleLength ::= INTEGER(0..16383)
-- units of 0.01m
-- available range (1..16382)
-- unavailable (16383)

6.6. DF_PositionOptionalInformation

Definitions for each of the data elements that make up the DF_PositionOptionalInformation are given below.

6.6.1. DE_PositionDelay

No.	6-1
Data name	DE_PositionDelay
Definition	Information about the position data update interval. If 100 ms or less, set the value to 1. If 3000 ms or more, set the value to 30. If unavailable, set the value to 31 (0x1F).
Data size	5 bits
Date type	Unsigned integer
Expression range	100 to 3000 ms
Resolution	100 ms

ASN.1 Representation:

PositionDelay ::= INTEGER(0..31)

- units of 100ms
- available range (1..30)
- 100ms or less (1)
- 3000ms or more (30)
- unavailable (31)

6.6.2. DE_RevisionCounter

No.	6-2
Data name	DE_RevisionCounter
Definition	Information about the count of message transmission with the same position and vehicle data since the last position fix. If 100 ms or less, set the value to 1. If 3000 ms or more, set the value to 30. When sending interpolation data, or if the period is not known, set the value to 31 (0x1F).
Data size	5 bits
Date type	Unsigned integer
Expression range	100 to 3000 ms
Resolution	100 ms

ASN.1 Representation:

RevisionCounter ::= INTEGER(0..31)

- units of 100ms
- available range (1..30)
- 100ms or less (1)
- 3000ms or more (30)
- unavailable (31)

6.6.3. DE_RoadFacilities

No.	6-3
Data name	DE_RoadFacilities
Definition	Information about road facilities at the location where the vehicle is traveling or stopped.
Data size	3 bits
Date type	Enumerated
Allocation	0: Unavailable 1: On road 2: Rest area or parking area 3: Interchange (incl. smart interchange) 4: Junction 5: Reserved 6: Reserved 7: Others

ASN.1 Representation:

RoadFacilities ::= ENUMERATED{

- | | |
|------------------------------|------|
| unavailable | (0), |
| on road | (1), |
| service area or parking area | (2), |
| interchange | (3), |
| junction | (4), |
| reserved | (5), |
| reserved | (6), |
| others | (7), |
- }

6.6.4. DE_RoadClassification

No.	6–4
Data name	DE_RoadClassification
Definition	Information about the category of the road on which the vehicle is traveling.
Data size	3 bits
Date type	Enumerated
Allocation	0: Unavailable 1: Express way (excl. urban express way) 2: Urban express way 3: National road or prefectural road 4: Other roads (minor street etc.) 5: Walkway 6: Off-road 7: Reserved

ASN.1 Representation:

```

RoadClassification ::= ENUMERATED{
    unavailable                (0),
    express way                (1),
    urban express way          (2),
    national road or prefectural road (3),
    other roads                 (4), -- minor street etc.
    walkway                    (5),
    off-road                   (6),
    reserved                   (7)
}

```

6.7. DF_GNSSStatusOptionalInformation

Definitions for each of the data elements that make up the DF_GNSSStatusOptionalInformation are given below.

6.7.1. DE_SemiMajorAxisOfPositionalErrorEllipse

No.	7-1
Data name	DE_SemiMajorAxisOfPositionalErrorEllipse
Definition	Information about the semimajor axis of the positional error ellipse (2σ), which is an indication of the reliability of the position data obtained from the GNSS. For values of 127 m or over, set the value to 254 (0xFE). If unavailable, set the value to 255 (0xFF).
Data size	8 bits
Data type	Unsigned integer
Expression range	0 to 127 m
Resolution	0.5 m

ASN.1 Representation:

SemiMajorAxisOfPositionalErrorEllipse ::= INTEGER(0..255)

- units of 0.5m
- available range (0..254)
- 127m or over (254)
- unavailable (255)

6.7.2. DE_SemiMinorAxisOfPositionalErrorEllipse

No.	7-2
Data name	DE_SemiMinorAxisOfPositionalErrorEllipse
Definition	Information about the semiminor axis of the positional error ellipse (2σ), which is an indication of the reliability of the position data obtained from the GNSS. For values of 127 m or over, set the value to 254 (0xFE). If unavailable, set the value to 255 (0xFF).
Data size	8 bits
Data type	Unsigned integer
Expression range	0 to 127 m
Resolution	0.5 m

ASN.1 Representation:

SemiMinorAxisOfPositionalErrorEllipse ::= INTEGER(0..255)

- units of 0.5m
- available range (0..254)
- 127m or over (254)
- unavailable (255)

6.7.3. DE_SemiMajorAxisOrientationOfPositionalErrorEllipse

No.	7-3
Data name	DE_SemiMajorAxisOrientationOfPositionalErrorEllipse
Definition	Information about the orientation of the semimajor axis of the positional error ellipse (2σ), which is an indication of the reliability of the position data obtained from the GNSS. For the angle of the semimajor axis, use due north as 0 degrees, and set the value to the angular orientation in clockwise direction. If unavailable, set the value to 65535 (0xFFFF).
Data size	16 bits
Date type	Unsigned integer
Expression range	0 to 359.9875 degrees
Resolution	0.0125 degrees

ASN.1 Representation:

SemiMajorAxisOrientationOfPositionalErrorEllipse ::= INTEGER(0..65535)

- units of 0.0125 degrees from North
- available range (0..28799)
- North (0)
- East (7200)
- South (14400)
- West (21600)
- unavailable (65535)

6.8. DF_PositionAcquisitionOptionalInformation

Definitions for each of the data elements that make up the DF_PositionOptionalInformation are given below.

6.8.1. DE_GNSSPositioningMode

No.	8–1
Data name	DE_GNSSPositioningMode
Definition	Information about the positioning mode used for the position data obtained from the GNSS.
Data size	2 bits
Date type	Enumerated
Allocation	0: Unavailable 1: No fix 2: 2D fix mode 3: 3D fix mode

```
ASN.1 Representation:  
GNSSPositioningMode ::= ENUMERATED{  
    unavailable      (0),  
    no fix           (1),  
    2D fix mode      (2),  
    3D fix mode      (3),  
}
```

6.8.2. DE_GNSSPDOP

No.	8–2
Data name	DE_GNSSPDOP
Definition	Information about the influence of the geometric arrangement of the satellites on the precision of the position data obtained from the GNSS. Set the value to the PDOP (Position Dilution Of Precision) value at the time of positioning. For values of 12.4 or over, set the value to 62 (0x3E). If unavailable, set the value to 63 (0x3F).
Data size	6 bits
Date type	Unsigned integer
Expression range	0 to 12.4
Resolution	0.2

ASN.1 Representation:
 GNSSPDOP ::= INTEGER{0..63}
 -- units of 0.2
 -- available range (0..62)
 -- 12.4 or over (62)
 -- unavailable (63)

6.8.3. DE_NumberOfGNSSSatellitesInUse

No.	8–3
Data name	DE_NumberOfGNSSSatellitesInUse
Definition	Information about the number of satellites being tracked to determine the position data obtained from the GNSS. For values of 14 or over, set the value to 14(0xE). If unavailable, set the value to 15 (0xF).
Data size	4 bits
Date type	Unsigned integer
Expression range	0 to 14
Resolution	1

ASN.1 Representation:
 NumberOfGNSSSatellitesInUse ::= INTEGER{0..15}
 -- units of 1
 -- available range (0..14)
 -- 14 or over (14)
 -- unavailable (15)

6.8.4. DE_GNSSMultiPathDetection

No.	8–4
Data name	DE_GNSSMultiPathDetection
Definition	Information about the multipath status (RF signals from GNSS satellites being reflected by buildings or other objects in the vicinity and also received along with the original signal) when determining the position data obtained from the GNSS.
Data size	2 bits
Date type	Enumerated
Allocation	0: Unavailable 1: No multipath 2: Multipath 3: Reserved

```
ASN.1 Representation:
GNSSMultipathDetection ::= ENUMERATED{
    unavailable      (0),
    no multipath     (1),
    multipath        (2),
    reserved         (3),
}
```

6.8.5. DE_DeadReckoningAvailability

No.	8–5
Data name	DE_DeadReckoningAvailability
Definition	Information about presence or absence of dead reckoning function that determines position from the information from various sensors.
Data size	1 bit
Date type	Boolean
Allocation	0: No dead reckoning function available 1: Dead reckoning function available

```
ASN.1 Representation:
DeadReckoningAvailability ::= BOOLEAN
-- unavailable      (0)
-- available        (1)
```

6.8.6. DE_MapMatchingAvailability

No.	8–6
Data name	DE_MapMatchingAvailability
Definition	Information about presence or absence of a function that matches the position data for the vehicle with map data.
Data size	1 bit
Date type	Boolean
Allocation	0: No map matching function available 1: Map matching function available

```
ASN.1 Representation:
MapMatchingAvailability ::= BOOLEAN
-- unavailable      (0)
-- available        (1)
```


6.9. DF_VehicleStatusOptionalInformation

Definitions for each of the data elements that make up the DF_VehicleStatusOptionalInformation are given below.

6.9.1. DE_YawRate

No.	9–1
Data name	DE_YawRate
Definition	Information about the yaw rate of the vehicle. Positive values indicate clockwise rotation. If unavailable, set the value to –32768 (0x8000).
Auto Size	16 bits
Date type	integer
Expression range	–327.67 to 327.67 degrees/s
Resolution	0.01 degrees/s

ASN.1 Representation:

YawRate ::= INTEGER(–32767..32768)

- units of 0.01 degree/s
- positive value specifies clockwise rotation
- available range (–32767..32767)
- unavailable (–32768)

6.9.2. DE_BrakeAppliedStatus

No.	9–2
Data name	DE_BrakeAppliedStatus
Definition	Information about the brake status of the vehicle. If no independent wheel brake information is available, set the value of [5] to 0, and set the values of [0] to [3] all to the same value according to the brake off/on status.
Data size	6 bits
Date type	Bit string
Allocation	[0]: Left front brake 0: OFF 1: ON [1]: Left rear brake 0: OFF 1: ON [2]: Right front brake 0: OFF 1: ON [3]: Right rear brake 0: OFF 1: ON [4]: Brake status availability 0: Unavailable 1: Available [5]: Independent wheel brake availability 0: Unavailable 1: Available

ASN.1 Representation:

```
BrakeAppliedStatus ::= BIT STRING{
    leftFrontBrake           (0),
    leftRearBrake            (1),
    rightFrontBrake          (2),
    rightRearBrake           (3),
    brakeStatusAvailability  (4),
    independentWheelBrakeAvailability (5)
}
```

6.9.3. DE_AuxiliaryBrakeAppliedStatus

No.	9–3
Data name	DE_AuxiliaryBrakeAppliedStatus
Definition	Information about the status of the auxiliary brake of the vehicle. If the vehicle is not equipped with an auxiliary brake, or the information is unavailable, set the value to 0.
Data size	2 bits
Date type	Enumerated
Allocation	0: Unavailable 1: OFF 2: ON 3: Reserved

ASN.1 Representation:

```
AuxiliaryBrakeAppliedStatus ::= ENUMERATED{
    unavailable (0),
    off         (1),
    on          (2),
    reserved    (3)
}
```

6.9.4. DE_ThrottlePosition

No.	9–4
Data name	DE_ThrottlePosition
Definition	Information about the throttle position of the vehicle. If unavailable, set the value to 255 (0xFF).
Data size	8 bits
Date type	Unsigned integer
Expression range	0 to 100%
Resolution	0.5%

ASN.1 Representation:
 ThrottlePosition ::= INTEGER(0..255)
 -- units of 0.5%
 -- available range (0..200)
 -- unavailable (255)

6.9.5. DE_ExteriorLights

No.	9–5
Data name	DE_ExteriorLights
Definition	Information about the status of the headlights, turn lights, and hazard lights of the vehicle.
Data size	8 bits
Date type	Bit string
Allocation	[0]: Headlights (low beam) 0: OFF 1: ON [1]: Headlights (high beam) 0: OFF 1: ON [2]: Left turn signal 0: OFF 1: ON [3]: Right turn signal 0: OFF 1: ON [4]: Headlight status availability 0: Unavailable 1: Available [5]: Turn signal status availability 0: Unavailable 1: Available [6]: Hazard signal status availability 0: Unavailable 1: Available [7]: Reserved (When hazard is ON, set [2] and [3] both to 1.)

ASN.1 Representation:
 ExteriorLights ::= BIT STRING{
 lowBeamHeadlightOn (0),
 highBeamHeadlightOn (1),
 leftTurnSignalOn (2),
 rightTurnSignalOn (3),
 headlightAvailability (4),
 turnSignalAvailability (5),
 hazardSignalAvailability (6),
 reserved (7)
 }

6.9.6. DE_AdaptiveCruiseControlStatus

No.	9–6
Data name	DE_AdaptiveCruiseControlStatus
Definition	Information about the ACC (Adaptive Cruise Control System) of the vehicle.
Data size	2 bits
Date type	Enumerated
Allocation	0: Unavailable or not equipped with system 1: OFF 2: ON (Not engaged) 3: ON (Engaged)

ASN.1 Representation:

```
AdaptiveCruiseControlStatus ::= ENUMERATED{
    unavailable      (0), -- unavailable or not equipped with system or sensor
    off              (1),
    on               (2), -- not engaged
    engaged          (3)
}
```

6.9.7. DE_CooperativeAdaptiveCruiseControlStatus

No.	9–7
Data name	DE_CooperativeAdaptiveCruiseControlStatus
Definition	Information about the C-ACC (Cooperative Adaptive Cruise Control System) of the vehicle.
Data size	2 bits
Date type	Enumerated
Allocation	0: Unavailable or not equipped with system 1: OFF 2: ON (Not engaged) 3: ON (Engaged)

ASN.1 Representation:

```
CooperativeAdaptiveCruiseControlStatus ::= ENUMERATED{
    unavailable      (0), -- unavailable or not equipped with system or sensor
    off              (1),
    on               (2), -- not engaged
    engaged          (3)
}
```

6.9.8. DE_PreCrashSafetyStatus

No.	9–8
Data name	DE_PreCrashSafetyStatus
Definition	Information about the PCS (Pre–Crash Safety System) of the vehicle.
Data size	2 bits
Date type	Enumerated
Allocation	0: Unavailable or not equipped with system 1: OFF 2: ON (Not engaged) 3: ON (Engaged)

ASN.1 Representation:

```
PreCrashSafetyStatus ::= ENUMERATED{
    unavailable      (0), -- unavailable or not equipped with system or sensor
    off              (1),
    on               (2), -- not engaged
    engaged          (3)
}
```

6.9.9. DE_AntilockBrakeStatus

No.	9–9
Data name	DE_AntilockBrakeStatus
Definition	Information about the ABS (Antilock Brake System) of the vehicle.
Data size	2 bits
Date type	Enumerated
Allocation	0: Unavailable or not equipped with system 1: OFF 2: ON (Not engaged) 3: ON (Engaged)

ASN.1 Representation:

```
AntilockBrakeStatus ::= ENUMERATED{
    unavailable      (0), -- unavailable or not equipped with system or sensor
    off              (1),
    on               (2), -- not engaged
    engaged          (3)
}
```

6.9.10. DE_TractionControlStatus

No.	9–10
Data name	DE_TractionControlStatus
Definition	Information about the TRC (Traction Control System) of the vehicle.
Data size	2 bits
Date type	Enumerated
Allocation	0: Unavailable or not equipped with system 1: OFF 2: ON (Not engaged) 3: ON (Engaged)

ASN.1 Representation:

```
TractionControlStatus ::= ENUMERATED{
    unavailable      (0), -- unavailable or not equipped with system or sensor
    off              (1),
    on               (2), -- not engaged
    engaged          (3)
}
```

6.9.11. DE_ElectronicStabilityControlStatus

No.	9–11
Data name	DE_ElectronicStabilityControlStatus
Definition	Information about the ESC (Electronic Stability Control System) of the vehicle.
Data size	2 bits
Date type	Enumerated
Allocation	0: Unavailable or not equipped with system 1: OFF 2: ON (Not engaged) 3: ON (Engaged)

ASN.1 Representation:

```

ElectronicStabilityControlStatus ::= ENUMERATED{
    unavailable      (0), -- unavailable or not equipped with system or sensor
    off              (1),
    on               (2), -- not engaged
    engaged          (3)
}

```

6.9.12. DE_LaneKeepingAssistStatus

No.	9–12
Data name	DE_LaneKeepingAssistStatus
Definition	Information about the LKA (Lane Keeping Assist System) of the vehicle.
Data size	2 bits
Date type	Enumerated
Allocation	0: Unavailable or not equipped with system 1: OFF 2: ON (Not engaged) 3: ON (Engaged)
ASN.1 Representation: <pre> LaneKeepingAssistStatus ::= ENUMERATED{ unavailable (0), -- unavailable or not equipped with system or sensor off (1), on (2), -- not engaged engaged (3) } </pre>	

6.9.13. DE_LaneDepartureWarningStatus

No.	9–13
Data name	DE_LaneDepartureWarningStatus
Definition	Information about the LDW (Lane Departure Warning System) of the vehicle.
Data size	2 bits
Date type	Enumerated
Allocation	0: Unavailable or not equipped with system 1: OFF 2: ON (Not engaged) 3: ON (Engaged)

ASN.1 Representation:

```
LaneDepartureWarningStatus ::= ENUMERATED{
    unavailable      (0), -- unavailable or not equipped with system or sensor
    off              (1),
    on                (2), -- not engaged
    engaged           (3)
}
```

6.10. DF_IntersectionInformation

Definitions for each of the data elements that make up the DF_IntersectionInformation are given below.

6.10.1. DE_IntersectionDistanceInformationAvailability

No.	10–1
Data name	DE_IntersectionDistanceInformationAvailability
Definition	Information about the availability of distance information to an upcoming intersection. If setting is not possible or unavailable, set the value to 0.
Data size	3 bits
Date type	Enumerated
Allocation	0: Unavailable 1: From map information 2: From roadside-to-vehicle communication 3 to 7: Reserved

ASN.1 Representation:

```
IntersectionDistanceInformationAvailability ::= ENUMERATED{
    unavailable      (0),
    from digital map  (1),
    from I2VCommunication (2),
    ... -- values 3 to 7 reserved
}
```


6.10.2. DE_IntersectionDistance

No.	10–2
Data name	DE_IntersectionDistance
Definition	Information about the distance to an upcoming intersection. If unavailable, set the value to 1023 (0x3FF).
Data size	10 bits
Data type	Unsigned integer
Expression range	0 to 1000 m
Resolution	1 m

ASN.1 Representation:

IntersectionDistance ::= INTEGER(0..1023)

-- units of 1 m

-- available range (0..1000)

-- unavailable (1023)

6.10.3. DE_IntersectionPositionInformationAvailability

No.	10–3
Data name	DE_IntersectionPositionInformationAvailability
Definition	Information about the availability of position information for an upcoming intersection. If setting is not possible or unavailable, set the value to 0.
Data size	3 bits
Data type	Enumerated
Allocation	0: Unavailable 1: From map information 2: From roadside-to-vehicle communication 3 to 7: Reserved

ASN.1 Representation:

IntersectionPositionInformationAvailability ::= ENUMERATED{

unavailable (0),

from digital map (1),

from I2VCommunication (2),

... -- values 3 to 7 reserved

}

6.10.4. DE_IntersectionLatitude

No.	10–4
Data name	DE_IntersectionLatitude
Definition	Information about the latitude of an upcoming intersection. Geodetic datum is WGS84 (or equivalent). Positive values indicate north latitude, and negative values indicate south latitude. If unavailable, set the value to –2147483648 (0x80000000).
Data size	32 bits
Date type	Integer
Expression range	–90 to 90 degrees
Resolution	0.0000001 degree

ASN.1 Representation:

IntersectionLatitude ::= INTEGER(–2147483648..2147483647)

-- units of 0.1 micro degree

-- available range (–9000000000..9000000000)

-- unavailable (–2147483648)

6.10.5. DE_IntersectionLongitude

No.	10–5
Data name	DE_IntersectionLongitude
Definition	Information about the longitude of an upcoming intersection. Geodetic datum is WGS84 (or equivalent). Positive values indicate east longitude, and negative values indicate west longitude. If unavailable, set the value to –2147483648 (0x80000000).
Data size	32 bits
Date type	Integer
Expression range	–180 to 180 degrees
Resolution	0.0000001 degree

ASN.1 Representation:

IntersectionLongitude ::= INTEGER(–2147483648..2147483647)

-- units of 0.1 micro degree

-- available range (–18000000000..18000000000)

-- unavailable (–2147483648)

6.11. DF_ExtendedInformation

Definitions for each of the data elements that make up the DF_ExtendedInformation are given below..

6.11.1. DE_ExtendedInformationForPrivateVehicle

No.	11-1
Data name	DE_ExtendedInformationForPrivateVehicle
Definition	Extended information for private vehicles. Set if the DE_VehicleRoleClassification is "Private vehicle".
Data size	8 bits
Data type	Enumerated
Allocation	The upper 4 bits are for driving information, and the lower 4 bits are for status information. Driving information 0: Driving 1: Newly licensed driver 2: Elderly driver 3: disabled driver 4: Hearing impaired driver 5: Temporary licensed driver 6: Riding with kindergartener or school children 7: Riding with social welfare support recipient 8 to 15: Reserved Status information 0: Normal 1: Getting on and off 2: Kindergartener or school children getting on and off 3: Social welfare support recipient getting on and off 4: Loading and unloading 5 to 14: Reserved 15: Emergency stop

ASN.1 Representation:**ExtendedVehicleInformationForPrivateVehicle ::= OCTET STRING(SIZE(1))**

```
-- SEQUENCE{
--   drivingInfo      DrivingInformationForPrivateVehicle,
--   4bits
--   statusInfo       StatusInformationForPrivateVehicle,
--   4bits
-- }
```

```
DrivingInformationForPrivateVehicle ::= ENUMERATED{
normal or no information (0),
newly-licensed driver (1),
elderly driver (2),
physically handicapped driver (3),
hearing impaired driver (4),
temporary licensed driver (5),
riding with kindergartener and school children (6),
riding with social-welfare support recipient (7),
... -- values 8 to 15 reserved
}
```

```
StatusInformationForPrivateVehicle ::= ENUMERATED{
normal (0),
getting on and off (1),
kindergartener and school children getting on and off (2),
social-welfare support recipient getting on and off (3),
loading and unloading (4),
... -- values 5 to 14 reserved
emergency stop (15)
}
```

6.11.2. DE_ExtendedInformationForEmergencyVehicle

No.	11-2
Data name	DE_ExtendedInformationForEmergencyVehicle
Definition	Extended information for emergency vehicles. Set if the DE_VehicleRoleClassification is "Emergency vehicle".
Data size	8 bits
Date type	Enumerated
Allocation	The upper 4 bits are reserved, and the lower 4 bits are for status information. Reserved 0: Normal / No information 1 to 15: Reserved Status information 0: Normal 1: Emergency driving 2: Operation on road 3 to 14: Reserved 15: Emergency stop

ASN.1 Representation:

```
ExtendedVehicleInformationForEmergencyVehicle ::= OCTET STRING(SIZE(1))
```

```
-- SEQUENCE{
--     reserveBits,
--         4bits, set to all 0
--     statusInfo StatusInformationForEmergencyVehicle,
--         4bits
-- }
```

```
StatusInformationForEmergencyVehicle ::= ENUMERATED{
    normal (0),
    emergency driving (1),
    operation on road (2),
    ... -- values 3 to 14 reserved
    emergency stop (15)
}
```

6.11.3. DE_ExtendedInformationForRoadWorkVehicle

No.	11-3
Data name	DE_ExtendedInformationForRoadWorkVehicle
Definition	Extended information for road work vehicles. Set if the DE_VehicleRoleClassification is "Road work vehicle".
Data size	8 bits
Data type	Enumerated
Allocation	The upper 4 bits are for restriction information, and the lower 4 bits are for status information. Restriction information 0: No restriction 1: Driving lane restriction 2: Road shoulder restriction 3 to 15: Reserved Status information 0: Normal 1: Under construction 2: Road working 3: Road working at low speed run 4: Accident handling 5: Traffic jam ahead 6 to 14: Reserved 15: Emergency stop

ASN.1 Representation:

ExtendedVehicleInformationForRoadWorkVehicle ::= OCTET STRING(SIZE(1))

```
-- SEQUENCE{
--   restrictInfo      RestrictionInformationForRoadWorkVehicle,
--       4bits
--   statusInfo        StatusInformationForRoadWorkVehicle,
--       4bits
-- }
```

RestrictionInformationForRoadWorkVehicle ::= ENUMERATED{

```
    no restriction                (0),
    driving lane restriction      (1),
    road shoulder restriction     (2),
    ... -- values 3 to 15 reserved
```

}

StatusInformationForRoadWorkVehicle ::= ENUMERATED{

```
    normal                      (0),
    under construction          (1),
    road working                (2),
    road working at low speed run (3),
    accident handling           (4),
    traffic jam ahead           (5),
    ... -- values 6 to 14 reserved
    emergency stop              (15)
```

}

6.11.4. DE_ExtendedInformationForPassengerTransportationVehicle,

No.	11-4
Data name	DE_ExtendedInformationForPassengerTransportationVehicle
Definition	Extended information for passenger transportation vehicle. Set if the DE_VehicleRoleClassification is "Passenger transportation vehicle".
Data size	8 bits
Data type	Enumerated
Allocation	The upper 4 bits are for driving information, and the lower 4 bits are for status information. Driving information 0: Normal / No information 1: Route bus in service 2: School bus in service 3: Welfare support car in service 4: Taxi in service 5 to 15: Reserved Status information 0: Normal 1: Getting on and off 2: Kindergartener or school children getting on and off 3: Social welfare support recipient getting on and off 4: Loading and unloading 5: Starting from a stop 6 to 14: Reserved 15: Emergency stop


```
ASN.1 Representation:
ExtendedVehicleInformationForPassengerTransportationVehicle ::= OCTET
STRING(SIZE(1))
-- SEQUENCE{
--   drivingInfo      DrivingInformationForPassengerTransportationVehicle,
--   4bits
--   statusInfo       StatusInformationForPassengerTransportationVehicle,
--   4bits
-- }
DrivingInformationForPassengerTransportationVehicle ::= ENUMERATED{
    normal or no information          (0),
    route bus in service              (1),
    school bus in service             (2),
    welfare support car in service    (3),
    taxi in service                   (4),
    ... -- values 5 to 15 reserved
}
StatusInformationForPassengerTransportationVehicle ::= ENUMERATED{
    normal                          (0),
    getting on and off               (1),
    kindergartener and school children getting on and off (2),
    social-welfare support recipient getting on and off (3),
    loading and unloading            (4),
    starting from a stop              (5),
    ... -- values 6 to 14 reserved
    emergency stop                   (15)
}
```

6.11.5. DE_ExtendedInformationForFreightTransportationVehicle

No.	11-5
Data name	DE_ExtendedInformationForFreightTransportationVehicle
Definition	Extended information for freight transportation vehicle. Set if the DE_VehicleRoleClassification is "Freight transportation vehicle".
Data size	8 bits
Date type	Enumerated
Allocation	The upper 4 bits are reserved, and the lower 4 bits are for status information. Reserved 0: Normal / No information 1 to 15: Reserved Status information 0: Normal 1: Loading and unloading goods 2 to 14: Reserved 15: Emergency stop

```
ASN.1 Representation:
ExtendedVehicleInformationForFreightTransportationVehicle ::= OCTET
STRING(SIZE(1))
-- SEQUENCE{
--   reserveBits,
--   4bits, set to all 0
--   statusInfo  StatusInformationForFreightTransportationVehicle,
--   4bits
-- }
StatusInformationForFreightTransportationVehicle ::= ENUMERATED{
    normal                (0),
    loading and unloading (1),
    ... -- values 2 to 14 reserved
    emergency stop        (15)
}
```

6.11.6. DE_ExtendedInformationForSpecialVehicle

No.	11-6
Data name	DE_ExtendedInformationForSpecialVehicle
Definition	Extended information for special vehicles (excluding road work vehicles). Set if the DE_VehicleRoleClassification is "Special vehicle".
Data size	8 bits
Date type	Enumerated
Allocation	The upper 4 bits are reserved, and the lower 4 bits are for status information. Reserved 0: Normal / No information 1 to 15: Reserved Status information 0: Normal 1: Road working 2 to 14: Reserved 15: Emergency stop

ASN.1 Representation:

```
ExtendedVehicleInformationForSpecialVehicle ::= OCTET STRING(SIZE(1))
```

```
-- SEQUENCE{
--   reserveBits,
--       4bits, set to all 0
--   statusInfo  StatusInformationForSpecialVehicle,
--       4bits
-- }
```

```
StatusInformationForSpecialVehicle ::= ENUMERATED{
    normal                (0),
    road working           (1),
    ... -- values 2 to 14 reserved
    emergency stop        (15)
}
```

6.11.7. DE_ExtendedInformationForOthers

No.	11-7
Data name	DE_ExtendedInformationForOthers
Definition	Extended information for vehicles not classified as private vehicle, emergency vehicle, road work vehicle, passenger transportation vehicle, freight transportation vehicle, or special vehicle. Set if the DE_VehicleRoleClassification is "Other, Unknown".
Data size	8 bits
Data type	Enumerated
Allocation	The upper 4 bits are reserved, and the lower 4 bits are for status information. Reserved 0: Normal / No information 1 to 15: Reserved Status information 0: Normal 1 to 14: Reserved 15: Emergency stop

ASN.1 Representation:

```
ExtendedVehicleInformationForOthers ::= OCTET STRING(SIZE(1))
```

```
-- SEQUENCE{
--   reserveBits,
--       4bits, set to all 0
--   statusInfo  StatusInformationForOthers,
--       4bits
-- }
```

```
StatusInformationForOthers ::= ENUMERATED{
    normal                (0),
    ... -- values 1 to 14 reserved
    emergency stop        (15)
```

```
}
```

6.12. DF_FreeFieldManagementInformation

Definitions for each of the data elements that make up the DF_FreeFieldManagementInformation are given below. If the number of Individual application data set in the free field is zero, the DF_FreeFieldManagementInformation data frame does not exist.

6.12.1. DE_IndividualAppHeaderLength

No.	12-1
Data name	DE_IndividualAppHeaderLength
Definition	Data size information for free application header field. The unit is bytes.
Data size	5 bits
Date type	Unsigned integer
Expression range	4 to 22 bytes
Resolution	1 byte

ASN.1 Representation:
 IndividualAppHeaderLength ::= INTEGER(0..31)
 -- units of 1 byte
 -- available range (4..22)

6.12.2. DE_NumberOfIndividualAppData

No.	12-2
Data name	DE_NumberOfIndividualAppData
Definition	Information about the number of individual application data in the free field. The maximum value is 7.
Data size	3 bits
Date type	Unsigned integer
Expression range	1 to 7
Resolution	1

ASN.1 Representation:
 NumberOfIndividualAppData ::= INTEGER(0..7)
 -- available range (1..7)

6.13. DF_IndividualAppDataManagementInformation

Definitions for each of the data elements that make up the DF_IndividualAppDataManagementInformation are given below.

6.13.1. DE_IndividualServiceStandardID

No.	13-1
Data name	DE_IndividualServiceStandardID
Definition	Information about the individual service standard ID for the individual application data.
Data size	8 bits
Date type	Enumerated
Allocation	Refer to Reference [9]

ASN.1 Representation:

```
IndividualServiceStandardID ::= ENUMERATED{
    reserved (0),
    ... -- values 1 to 255 reserved and assigned by the operation management organization
}
```

6.13.2. DE_IndividualAppDataAddress

No.	13-2
Data name	DE_IndividualAppDataAddress
Definition	Start position of the individual application data, taking the start of the free application data field as zero. The unit is bytes.
Data size	8 bits
Date type	Unsigned integer
Expression range	0 to 59th byte
Resolution	1 byte

ASN.1 Representation:

```
IndividualAppDataAddress ::= INTEGER(0..255)
-- units of 1byte (first address of freeAppDataField as 0th byte)
-- available range (0..59)
```

6.13.3. DE_IndividualAppDataLength

No.	13-3
Data name	DE_IndividualAppDataLength
Definition	Data size information for the individual application data. The unit is bytes.
Data size	8 bits
Date type	Unsigned integer
Expression range	1 to 60 bytes
Resolution	1 byte

ASN.1 Representation:
IndividualAppDataLength ::= INTEGER(0..255)
-- units of 1byte
-- available range (1..60)

ITS Connect Systems

**Inter-vehicle Communication Message
Specifications**

**ITS Connect TD-001 Ver.1.0
[English Translation]**

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