

**ENGLISH TRANSLATION**

**700 MHz BAND**

**INTELLIGENT TRANSPORT SYSTEMS**

**Experimental Guideline for  
Inter-vehicle Communication Messages**

**ITS FORUM RC-013 Ver. 1.1**

**Version 1.0    March        31th 2014**

**Version 1.1    September 30th 2017**

**ITS Info-communications Forum  
of Japan**



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## Introduction

This guideline defines the message specifications for an inter-vehicle communications system to be used experimentally for testing communication between mobile stations in an environment where inter-vehicle/roadside-to-vehicle communications are carried out in accordance with the "700MHz Band Intelligent Transport Systems" (ARIB STD-T109), also including cases where the "700MHz Band Intelligent Transport Systems - Extended Functions Guideline" (ITS FORUM RC-010) is used together.

Also, assuming that applications utilizing the 700MHz band intelligent transport systems are going to be diversified in the experiment, the definition of information used for message identification is defined and described in the appendix.

It is hoped that this guideline will fully be verified by organizations and other parties which utilize the respective standards for thorough practical verification and validation testing.

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700 MHz Band Intelligent Transport Systems  
Experimental Guideline for Inter-vehicle Communication Messages

Contents

Chapter 1	Overview .....	1
Chapter 2	Reference Materials .....	3
Chapter 3	Terms and Abbreviations .....	5
3.1	Terms .....	5
3.2	Abbreviations .....	5
Chapter 4	Messages.....	7
4.1	Application scope.....	7
4.2	Message overview .....	8
4.3	Configuration of Basic Message.....	8
4.4	Storage rules.....	10
Chapter 5	Data Frames.....	11
5.1	Common application header field.....	11
5.1.1	DF_CommonFieldManagementInformation.....	11
5.2	Common application data field.....	12
5.2.1	DF_TimeInformation.....	12
5.2.2	DF_PositionInformation.....	13
5.2.3	DF_VehicleStatusInformation .....	13
5.2.4	DF_VehicleAttributeInformation .....	14
5.2.5	DF_PositionOptionalInformation.....	15
5.2.6	DF_GPSStatusOptionalInformation.....	16
5.2.7	DF_PositionAcquisitionOptionalInformation .....	17
5.2.8	DF_VehicleStatusOptionalInformation .....	18
5.2.9	DF_IntersectionInformation.....	20
5.2.10	DF_ExtendedInformation.....	21
5.3	Free application header field.....	22
5.3.1	DF_FreeFieldManagementInformation .....	22
5.3.2	DF_IndividualAppDataManagementInformationSet .....	23
5.3.3	DF_IndividualAppDataManagementInformation .....	23
5.4	Free application data field .....	24
Chapter 6	Data Elements.....	25

6.1	DF_CommonFieldManagementInformation .....	25
6.1.1	DE_CommonServiceStandardID.....	25
6.1.2	DE_MessageID.....	25
6.1.3	DE_Version .....	26
6.1.4	DE_VehicleID.....	26
6.1.5	DE_IncrementCounter.....	27
6.1.6	DE_CommonAppDataLength.....	27
6.1.7	DE_OptionFlag .....	28
6.2	DF_TimeInformation.....	29
6.2.1	DE_LeapSecondsCorrectionAvailability .....	29
6.2.2	DE_Hour .....	29
6.2.3	DE_Minute .....	30
6.2.4	DE_Second .....	30
6.3	DF_PositionInformation.....	31
6.3.1	DE_Latitude.....	31
6.3.2	DE_Longitude.....	31
6.3.3	DE_Elevation .....	32
6.3.4	DE_PositionConfidence.....	33
6.3.5	DE_ElevationConfidence .....	35
6.4	DF_VehicleStatusInformation .....	36
6.4.1	DE_Speed .....	36
6.4.2	DE_Heading.....	37
6.4.3	DE_Acceleration.....	37
6.4.4	DE_SpeedConfidence.....	38
6.4.5	DE_HeadingConfidence.....	39
6.4.6	DE_AccelerationConfidence.....	40
6.4.7	DE_TransmissionState.....	41
6.4.8	DE_SteeringWheelAngle .....	41
6.5	DF_VehicleAttributeInformation .....	42
6.5.1	DE_VehicleSizeClassification .....	42
6.5.2	DE_VehicleRoleClassification.....	43
6.5.3	DE_VehicleWidth .....	44
6.5.4	DE_VehicleLength.....	44
6.6	DF_PositionOptionalInformation.....	45
6.6.1	DE_PositionDelay .....	45

---

6.6.2	DE_RevisionCounter .....	45
6.6.3	DE_RoadFacilities .....	46
6.6.4	DE_RoadClassification .....	47
6.7	DF_GPSStatusOptionalInformation.....	48
6.7.1	DE_SemiMajorAxisOfPositionalErrorEllipse .....	48
6.7.2	DE_SemiMinorAxisOfPositionalErrorEllipse .....	48
6.7.3	DE_SemiMajorAxisOrientationOfPositionalErrorEllipse .....	49
6.8	DF_PositionAcquisitionOptionalInformation .....	50
6.8.1	DE_GPSPositioningMode .....	50
6.8.2	DE_GPSPDOP .....	50
6.8.3	DE_NumberOfGPSSatellitesInUse .....	51
6.8.4	DE_GPSMultiPathDetection .....	51
6.8.5	DE_DeadReckoningAvailability .....	52
6.8.6	DE_MapMatchingAvailability.....	52
6.9	DF_VehicleStatusOptionalInformation .....	53
6.9.1	DE_YawRate .....	53
6.9.2	DE_BrakeAppliedStatus .....	53
6.9.3	DE_AuxiliaryBrakeAppliedStatus.....	54
6.9.4	DE_ThrottlePosition .....	54
6.9.5	DE_ExteriorLights.....	55
6.9.6	DE_AdaptiveCruiseControlStatus.....	56
6.9.7	DE_CooperativeAdaptiveCruiseControlStatus .....	56
6.9.8	DE_PreCrashSafetyStatus .....	57
6.9.9	DE_AntilockBrakeStatus .....	57
6.9.10	DE_TractionControlStatus.....	58
6.9.11	DE_ElectronicStabilityControlStatus.....	58
6.9.12	DE_LaneKeepingAssistStatus.....	59
6.9.13	DE_LaneDepartureWarningStatus .....	59
6.10	DF_IntersectionInformation.....	60
6.10.1	DE_IntersectionDistanceInformationAvailability.....	60
6.10.2	DE_IntersectionDistance.....	61
6.10.3	DE_IntersectionPositionInformationAvailability .....	61
6.10.4	DE_IntersectionLatitude .....	62
6.10.5	DE_IntersectionLongitude .....	62
6.11	DF_ExtendedInformation.....	63

---

6.11.1	DE_ExtendedInformationForPrivateVehicle.....	63
6.11.2	DE_ExtendedInformationForEmergencyVehicle .....	65
6.11.3	DE_ExtendedInformationForRoadWorkVehicle .....	66
6.11.4	DE_ExtendedInformationForPassengerTransportationVehicle,.....	68
6.11.5	DE_ExtendedInformationForFreightTransportationVehicle.....	70
6.11.6	DE_ExtendedInformationForSpecialVehicle .....	71
6.11.7	DE_ExtendedInformationForOthers.....	72
6.12	DF_FreeFieldManagementInformation.....	73
6.12.1	DE_IndividualAppHeaderLength.....	73
6.12.2	DE_NumberOfIndividualAppData .....	73
6.13	DF_IndividualAppDataManagementInformation.....	74
6.13.1	DE_IndividualServiceStandardID .....	74
6.13.2	DE_IndividualAppDataAddress .....	74
6.13.3	DE_IndividualAppDataLength .....	75
Annex 1	CommunicationTypeInfoInformation.....	77
1	Definition of CommunicationTypeInfoInformation .....	78
2	Application of CommunicationTypeInfoInformation.....	79
Annex 2	Guideline Revision Rules .....	81
Annex 3	Driving safety assistance service examples using inter-vehicle communications .....	83
1	Prevention of collision when making a left turn .....	83
2	Prevention of collision when making a right turn .....	84
3	Prevention of collision at intersection.....	85
4	Provision of emergency vehicle information .....	86

## Chapter 1 Overview

This document defines specifications for the message format and its configuration data (data frames, data elements) for inter-vehicle communications.

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## Chapter 2 Reference Materials

Items not specifically described in this guideline are to be dealt with in accordance with the following standards.

- [1] ASV-4 Project                      Basic Design Specifications for Communication Based Implementation Systems
- [2] SAE J2735\_200911                Dedicated short range communication (DSRC) message set dictionary
- [3] ETSI TS 102 637-2                Intelligent Transport Systems (ITS) Vehicular Communications Basic Set of Applications Part 3: Specifications of Cooperative Awareness Basic Service
- [4] ETSI TS 102 637-3                Intelligent Transport Systems (ITS) Vehicular Communications Basic Set of Applications Part 3: Specifications of Decentralized Environmental Notification Basic Service
- [5] ETSI TS 102 894-2                Intelligent Transport Systems (ITS) Users and Applications Requirements Part 2: Applications and Facilities Layer Common Data Dictionary
- [6] ARIB STD-T109                    700MHz Band Intelligent Transport Systems Standard Version 1.3
- [7] ITS FORUM RC-010                700MHz Band Intelligent Transport Systems - Extended Functions Guideline Ver. 1.1

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## Chapter 3 Terms and Abbreviations

### 3.1 Terms

- **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.

### 3.2 Abbreviations

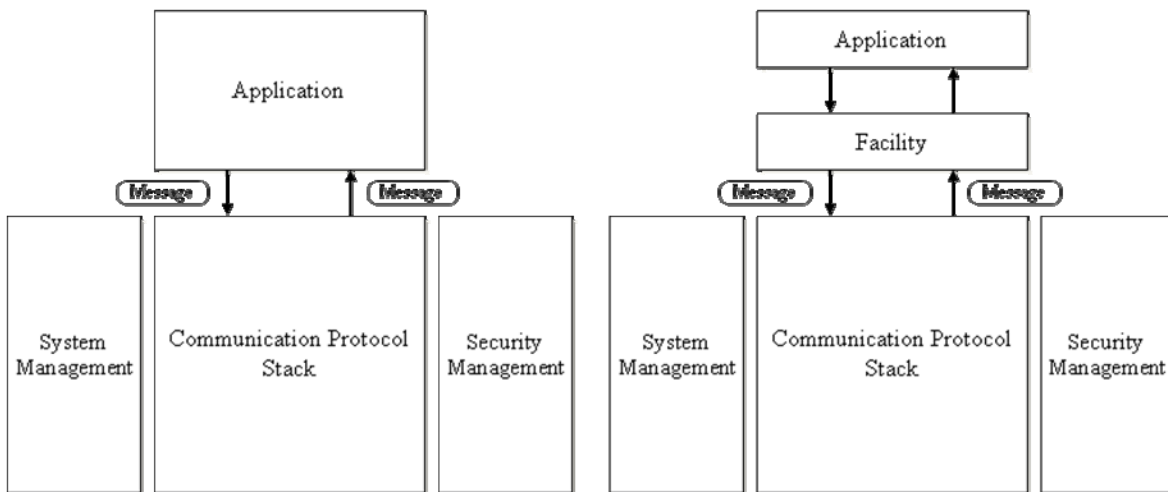
- **ASN.1:** Abstract Syntax Notation 1

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## 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 [6] and [7].

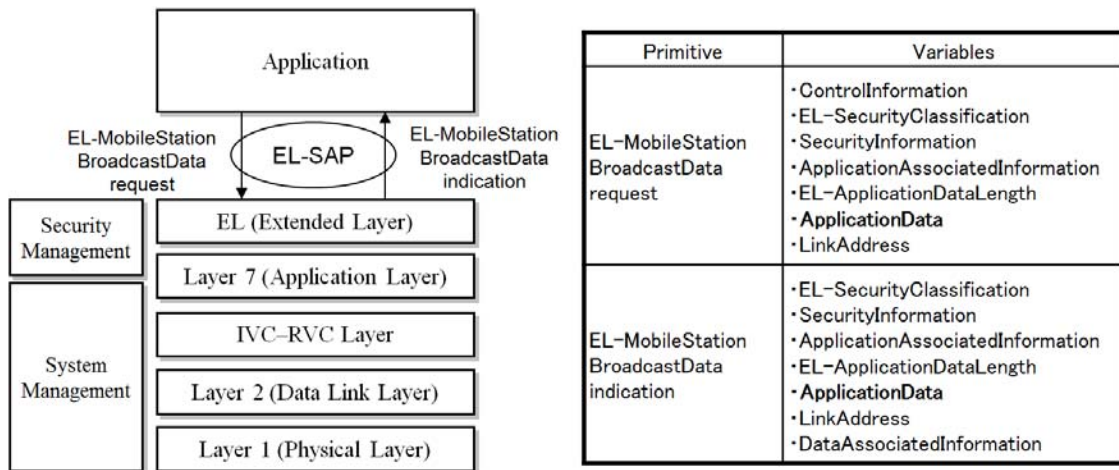


Figure 4-2 Relationship between messages in 700 MHz Band Intelligent Transport Systems

#### 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\_GPSStatusOptionalInformation, 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_PositionOptionalInformation (*)	2	0 to 26	Optional. Setting sequence may not be changed.
		DF_GPSStatusOptionalInformation (*)	4		
		DF_PositionAcquisitionOptionalInformation (*)	2		
		DF_VehicleStatusOptionalInformation (*)	7		
		DF_IntersectionInformation (*)	10		
DF_ExtendedInformation (*)	1				
Free field	Free application header field	DF_FreeFieldManagementInformation	0 to 1	0 to 22	Optional. Size depends on number of individual application data set.
		DF_IndividualAppDataManagementInformationSet	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,
    gpsStatOptInfo    GPSStatusOptionalInformation        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 without deleting the data element area.
- (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 without deleting the data element area, as in the case where no proper value is available.
- (3) For optional data frames (optional information in common 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 without deleting the data element area, 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.

## 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 indicate the hours, minutes, and seconds time information as obtained from a GPS or similar. (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 GPS 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 without deleting the field.

**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,
  posConf  PositionConfidence,
  eleConf  ElevationConfidence
}

```

### 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 without deleting the field.

**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,
    steerAngle   SteeringWheelAngle
}

```

#### 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 without deleting the field.

**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,
  vLen       VehicleLength
}

```

**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 GPS 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\_GPSStatusOptionalInformation**

The DF\_GPSStatusOptionalInformation is designed for setting detailed or additional information pertaining to the DF\_PositionInformation. This data frame is optional. The configuration of DF\_GPSStatusOptionalInformation is shown in Table 5–7. Three data elements indicating the reliability index (horizontal error ellipse) of the position information obtained from the GPS are available: DE\_SemiMajorAxisOfPositionalErrorEllipse, DE\_SemiMinorAxisOfPositionalErrorEllipse, and DE\_SemiMajorAxisOrientationOfPositionalErrorEllipse. The total data size is 4 bytes (= 32 bits). Setting of DF\_GPSStatusOptionalInformation 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\_GPSStatusOptionalInformation**

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

**ASN.1 Representation:**

```

GPSStatusOptionalInformation ::= 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\_GPSPositioningMode for positioning dimension information, DE\_GPSPDOP for positional dilution of precision, and DE\_NumberOfGPSSatellitesInUse for number of satellites being tracked. In addition, three data elements for information about positioning related functions are available: DE\_GPSPMultiPathDetection for GPS 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_GPSPositioningMode	2 bits	
DE_GPSPDOP	6 bits	
DE_NumberOfGPSSatellitesInUse	4 bits	
DE_GPSPMultiPathDetection	2 bits	
DE_DeadReckoningAvailability	1 bit	
DE_MapMatchingAvailability	1 bit	

**ASN.1 Representation:**

```
PositionAcquisitionOptionalInformation ::= SEQUENCE{
  gpsPosMode      GPSPositioningMode,
  gpsPDOP         GPSPDOP,
  numGPSSat      NumberOfGPSSatellitesInUse,
  gpsMPath        GPSPMultiPathDetection,
  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,
  lKASStat           LaneKeepingAssistStatus,
  lDWSStat           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. When the free field is used for setting individual application data, the following two data frames must be set. However, when the free field is not used for setting individual application data, the following two data frames are not 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	

<p>ASN.1 Representation:</p> <pre> IndividualAppDataManagementInformation ::= SEQUENCE{   indivServStdID      IndividualServiceStandardID,   indivAppDataAddress IndividualAppDataAddress,   indivAppDataLen    IndividualAppDataLength } </pre>
--

#### 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). For inter-vehicle communications common service standard, set the value to 1.
Data size	3 bits
Date type	Enumerated
Allocation	0: Reserved 1: Inter-vehicle common service standard 2 to 7: Reserved (allocated to other service standards)

#### 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

<pre> ASN.1 Representation: MessageID ::= ENUMERATED{     reserved          (0),     Basic Message    (1),     reserved          (2),     reserved          (3) } </pre>
--

### 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

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

### 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

<pre> ASN.1 Representation: VehicleID ::= INTEGER(0..4294967295) </pre>
---

## 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
Date type	Bit string
Allocation	[0]: DF_PositionOptionalInformationAvailability [1]: DF_GPSStatusOptionalInformationAvailability [2]: DF_PositionAcquisitionOptionalInformationAvailability [3]: DF_VehicleStatusOptionalInformationAvailability [4]: DF_IntersectionInformationAvailability [5]: DF_ExtendedInformationAvailability [6]: ExtendedOptionalFlagAvailability [7]: FreeFieldAvailability

## ASN.1 Representation:

```
OptionFlag ::= BITSTRING{
    positionOptionalInformationAvailability      (0),
    gpsStatusOptionalInformationAvailability    (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

<p>ASN.1 Representation:  LeapSecondsCorrectionAvailability ::= BOOLEAN  -- unavailable (0)  -- available (1)</p>
---

### 6.2.2 DE\_Hour

No.	2-2
Data name	DE_Hour
Definition	Time (hours) information for point when content for message transmission was finalized. Set as UTC hour + 9. If time delay correction for GPS 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

<p>ASN.1 Representation:  Hour ::= INTEGER(0..127)  -- units of 1 hour  -- available range (0..23)  -- unavailable (127)</p>
--

## 6.2.3 DE\_Minute

No.	2–3
Data name	DE_Minute
Definition	Time (minutes) information for point when content for message transmission was finalized. If time delay correction for GPS 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 for point when content for message transmission was finalized. If time delay correction for GPS 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 (-900000000..900000000)

-- 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 (-1800000000..1800000000)

-- 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
Date 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 GPS 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:

```
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 GPS 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 <sup>2</sup>
Resolution	0.01 m/s <sup>2</sup>

ASN.1 Representation:  
Acceleration ::= INTEGER(-32768..32767)  
-- units of 0.01 m/s<sup>2</sup>  
-- 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 <sup>2</sup> class 2: 5 m/s <sup>2</sup> class 3: 2.5 m/s <sup>2</sup> class 4: 1 m/s <sup>2</sup> class 5: 0.5 m/s <sup>2</sup> class 6: 0.1 m/s <sup>2</sup> class 7: 0.05 m/s <sup>2</sup> or less class

## ASN.1 Representation:

```
AccelerationConfidence ::= ENUMERATED{
  unavailable (0),
  more than 5m/s2 class (1),
  5m/s2 class (2),
  2.5m/s2 class (3),
  1m/s2 class (4),
  0.5m/s2 class (5),
  0.1m/s2 class (6),
  0.05m/s2 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\_GPSStatusOptionalInformation

Definitions for each of the data elements that make up the DF\_GPSStatusOptionalInformation 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 (2 $\sigma$ ), which is an indication of the reliability of the position data obtained from the GPS. 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
Date 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 (2 $\sigma$ ), which is an indication of the reliability of the position data obtained from the GPS. 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
Date 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 (2 $\sigma$ ), which is an indication of the reliability of the position data obtained from the GPS. 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\_GPSPositioningMode

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

```

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

```

## 6.8.2 DE\_GPSPDOP

No.	8-2
Data name	DE_GPSPDOP
Definition	Information about the influence of the geometric arrangement of the satellites on the precision of the position data obtained from the GPS. 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:  
 GPSPDOP ::= INTEGER{0..63}  
 -- units of 0.2  
 -- available range (0..62)  
 -- 12.4 or over (62)  
 -- unavailable (63)

### 6.8.3 DE\_NumberOfGPSSatellitesInUse

No.	8-3
Data name	DE_NumberOfGPSSatellitesInUse
Definition	Information about the number of satellites being tracked to determine the position data obtained from the GPS. 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:  
 NumberOfGPSSatellitesInUse ::= INTEGER{0..15}  
 -- units of 1  
 -- available range (0..14)  
 -- 14 or over (14)  
 -- unavailable (15)

### 6.8.4 DE\_GPSMultiPathDetection

No.	8-4
Data name	DE_GPSMultiPathDetection
Definition	Information about the multipath status (RF signals from GPS 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 GPS.
Data size	2 bits
Date type	Enumerated
Allocation	0: Unavailable 1: No multipath 2: Multipath 3: Reserved

```

ASN.1 Representation:
GPSMultipathDetection ::= 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	<p>[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</p> <p>(When hazard is ON, set [2] and [3] both to 1.)</p>

```

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

#### 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
Date 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
Date 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
Date type	Enumerated
Allocation	<p>The upper 4 bits are for driving information, and the lower 4 bits are for status information.</p> <p>Driving information</p> <p>0: Driving</p> <p>1: Newly licensed driver</p> <p>2: Elderly driver</p> <p>3: disabled driver</p> <p>4: Hearing impaired driver</p> <p>5: Temporary licensed driver</p> <p>6: Riding with kindergartener or school children</p> <p>7: Riding with social welfare support recipient</p> <p>8 to 15: Reserved</p> <p>Status information</p> <p>0: Normal</p> <p>1: Getting on and off</p> <p>2: Kindergartener or school children getting on and off</p> <p>3: Social welfare support recipient getting on and off</p> <p>4: Loading and unloading</p> <p>5 to 14: Reserved</p> <p>15: Emergency stop</p>

## 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	<p>The upper 4 bits are reserved, and the lower 4 bits are for status information.</p> <p>Reserved</p> <p>0: Normal / No information</p> <p>1 to 15: Reserved</p> <p>Status information</p> <p>0: Normal</p> <p>1: Emergency driving</p> <p>2: Operation on road</p> <p>3 to 14: Reserved</p> <p>15: Emergency stop</p>

## 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
Date type	Enumerated
Allocation	<p>The upper 4 bits are for restriction information, and the lower 4 bits are for status information.</p> <p>Restriction information</p> <ul style="list-style-type: none"><li>0: No restriction</li><li>1: Driving lane restriction</li><li>2: Road shoulder restriction</li><li>3 to 15: Reserved</li></ul> <p>Status information</p> <ul style="list-style-type: none"><li>0: Normal</li><li>1: Under construction</li><li>2: Road working</li><li>3: Road working at low speed run</li><li>4: Accident handling</li><li>5: Traffic jam ahead</li><li>6 to 14: Reserved</li><li>15: Emergency stop</li></ul>

## 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	<p>The upper 4 bits are for driving information, and the lower 4 bits are for status information.</p> <p>Driving information</p> <p>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</p> <p>Status information</p> <p>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</p>



```
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	<p>The upper 4 bits are reserved, and the lower 4 bits are for status information.</p> <p>Reserved</p> <p>0: Normal / No information</p> <p>1 to 15: Reserved</p> <p>Status information</p> <p>0: Normal</p> <p>1: Loading and unloading goods</p> <p>2 to 14: Reserved</p> <p>15: Emergency stop</p>

<pre> 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) } </pre>
---

## 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	<p>The upper 4 bits are reserved, and the lower 4 bits are for status information.</p> <p>Reserved</p> <p>0: Normal / No information</p> <p>1 to 15: Reserved</p> <p>Status information</p> <p>0: Normal</p> <p>1: Road working</p> <p>2 to 14: Reserved</p> <p>15: Emergency stop</p>

## 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
Date type	Enumerated
Allocation	<p>The upper 4 bits are reserved, and the lower 4 bits are for status information.</p> <p>Reserved</p> <p>0: Normal / No information</p> <p>1 to 15: Reserved</p> <p>Status information</p> <p>0: Normal</p> <p>1 to 14: Reserved</p> <p>15: Emergency stop</p>

## 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	(Allocated by the operation management organization.)

<p>ASN.1 Representation:  IndividualServiceStandardID ::= ENUMERATED{  reserved (0),  ... -- values 1 to 255 reserved and assigned by the operation management organization  }</p>
--

## 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

<p>ASN.1 Representation:  IndividualAppDataAddress ::= INTEGER(0..255)  -- units of 1byte (first address of freeAppDataField as 0th byte)  -- available range (0..59)</p>
---

## 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

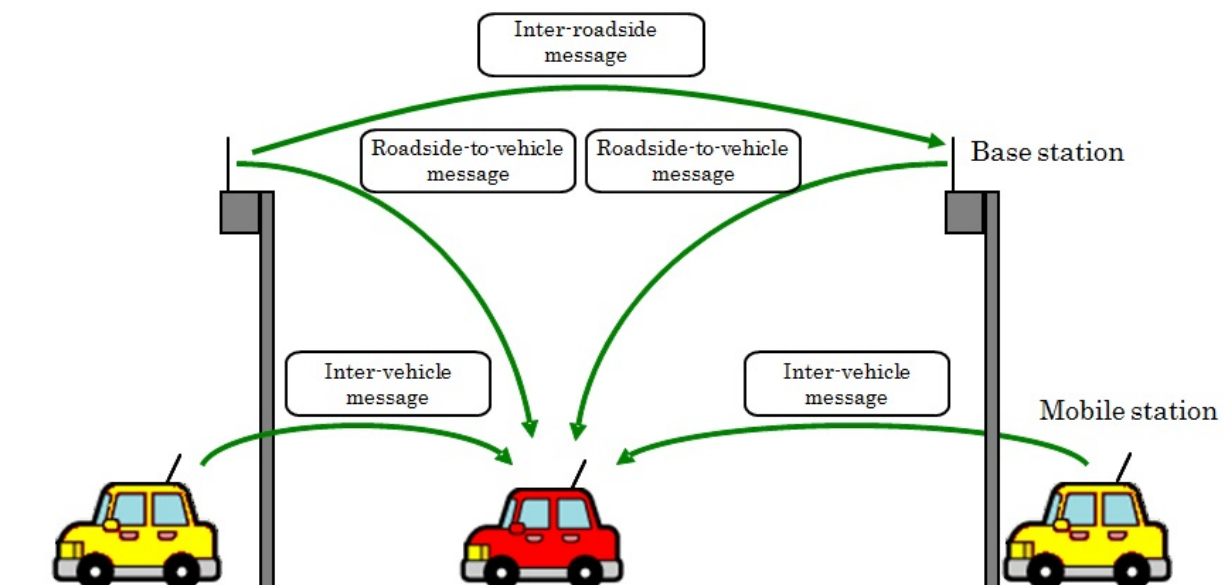
ASN.1 Representation:  
IndividualAppDataLength ::= INTEGER(0..255)  
-- units of 1byte  
-- available range (1..60)

[Blank]



## Annex 1 CommunicationTypeInformation

In a situation where multiple services are provided via a single wireless system, and the service standards are defined by multiple service standard developing organizations, messages conforming to different service standards will be exchanged via the wireless communication (see Figure S1–1). In the case of applications intended to provide driving safety assistance or similar, messages will be broadcast to stations in the vicinity without limiting these to a specific receiver. The application (or the facility layer) therefore requires an identification function that can determine whether a received message is required for the respective station or not. This identification function should be defined by a common specification independent of the CommunicationTypeInformation (inter-vehicle communications, roadside-to-vehicle communications, or inter-roadside communications), and it should be implemented with a minimum of required information. An experimental definition of information for such a message identification function according to a common specification is given in this section.



**Figure S1–1 Conceptual diagram of single wireless communication system supporting various types of messages**

\* In this figure, on-board unit is called mobile station, and roadside unit is called base station.

This annex defines CommunicationTypeInformation to be used as message identification information.

## 1 Definition of CommunicationTypeInformation

CommunicationTypeInformation is defined as information that allows identification of what type of receiver is to use the sending message. By performing identification using CommunicationTypeInformation at a point prior to the application (communication layer), more effective processing should be possible. The information therefore is assumed not to be contained within the message but in a communication header. The definition of CommunicationTypeInformation is given in Table S1-1. The CommunicationTypeInformation data size is 3 bits. 0 is reserved, 7 is reserved for the system, and 1 to 6 are allocated to what type of receiver is to use the sending message. Also, in the standard (compliant document [1]), the base station includes the Roadside-to-Vehicle Communication (RVC) base station and the Roadside-to-Vehicle Communication and Inter-Roadside Communication (RVC-IRC) base station. The RVC base station performs land mobile radio communication with mobile stations. The RVC-IRC base station performs communications for fixed service which has a close relationship to a land mobile service with the other RVC-IRC base stations as well as mobile radio communications. Table A1.1 uses these terms as needed. The description of communication format allocations uses the expression "Information from xx station to yy station", but this does not indicate that the information is used only for the receiving station described in the assignment, but rather indicates the receiving station that the transmitting station assumes as the destination of the information.

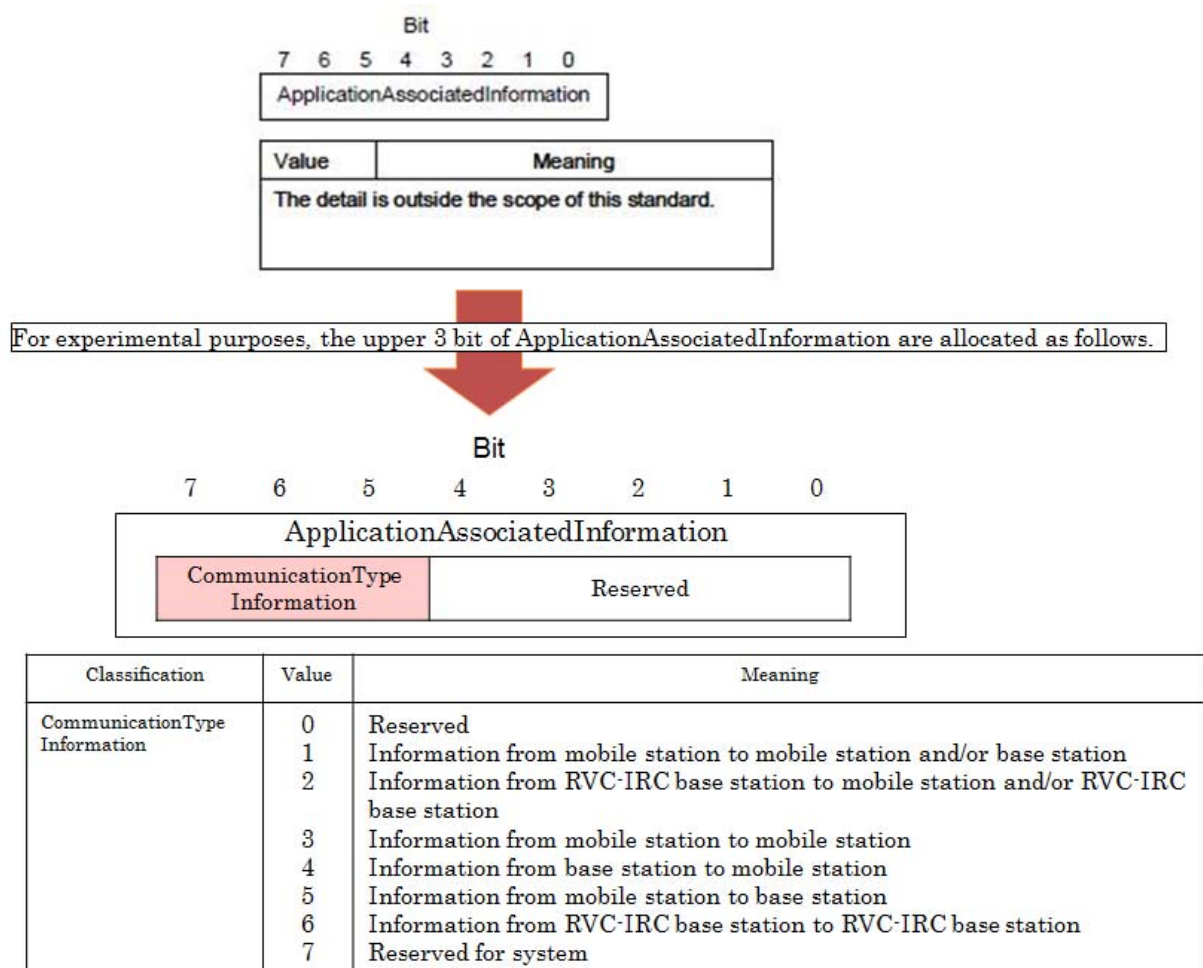
**Table S1-1 Definition of CommunicationTypeInformation**

Classification	Value	Meaning
Communication Type Information	0	Reserved
	1	Information from mobile station to mobile station and/or base station
	2	Information from RVC-IRC base station to mobile station and/or RVC-IRC base station
	3	Information from mobile station to mobile station
	4	Information from base station to land mobile station
	5	Information from mobile station to base station
	6	Information from RVC-IRC base station to RVC-IRC base station
	7	Reserved for system

## 2 Application of CommunicationTypeInformation

This section describes how to apply the CommunicationTypeInformation to the standard (Reference Document [6]).

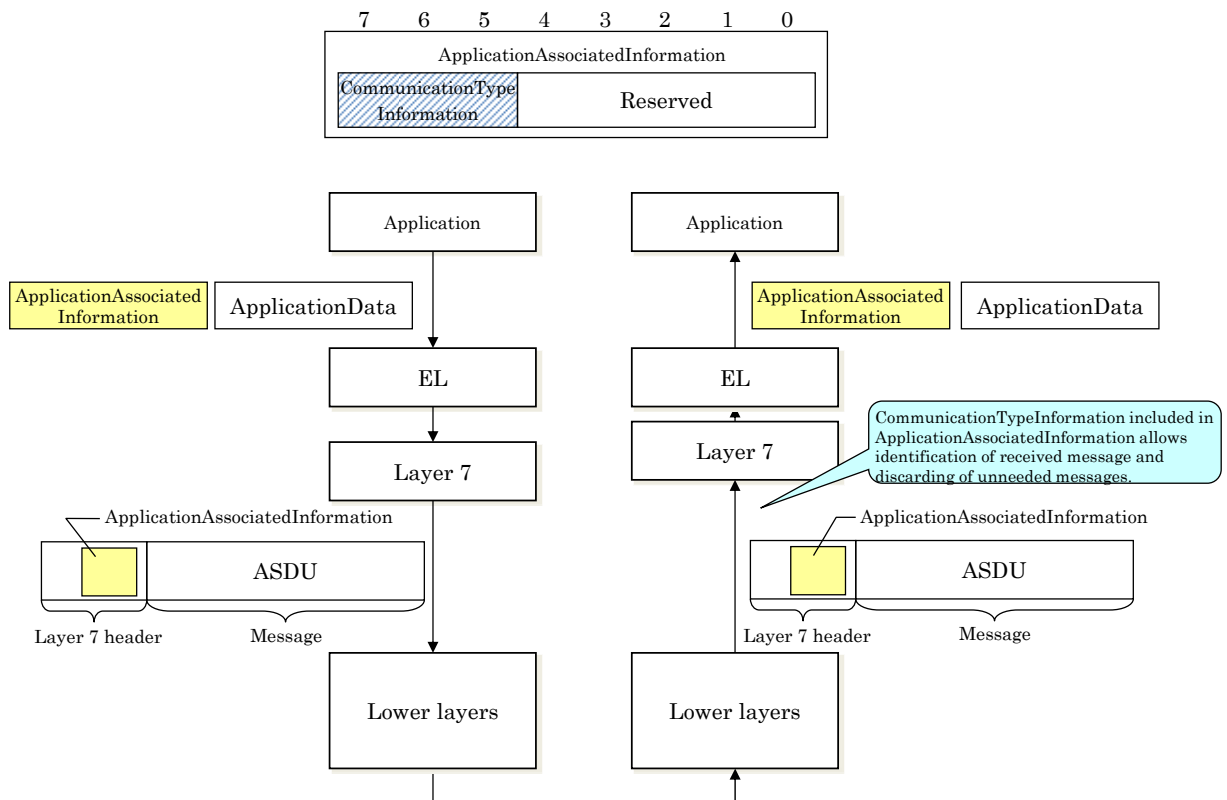
According to the Standard, ApplicationAssociatedInformation exists in the Layer 7 header, with a data size of 8 bit, but no further specification is made (it is considered outside the range of the Standard). The first 3 bits of the ApplicationAssociatedInformation are allocated to the above mentioned CommunicationTypeInformation. The structure of the ApplicationAssociatedInformation and the allocated CommunicationTypeInformation are shown in Figure S1-2.



**Figure S1-2 Structure of ApplicationAssociatedInformation and CommunicationTypeInformation**

In the Standard, the ApplicationAssociatedInformation is passed between the application and Layer 7 as one of the parameters of each primitive. An example for the flow of

ApplicationAssociatedInformation is shown in Figure S1-3. ApplicationAssociatedInformation is first generated by the application on the sending side and passed to Layer 7 via the EL (Extended Layer). In Layer 7, the information is stored in the Layer 7 header and sent out by wireless transmission via the lower layers. On the receiving side, the header is passed from the lower layers to Layer 7, and ApplicationAssociatedInformation can be extracted from it. Finally, it is passed on via the EL along with the application message (ApplicationData). By storing CommunicationTypeInfoInformation in the ApplicationAssociatedInformation, the receiving side can use the CommunicationTypeInfoInformation from Layer 7 to identify the message and discard messages from a communication type that is not needed.



**Figure S1-3 Example of the processing flow about ApplicationAssociatedInformation with CommunicationTypeInfoInformation**

## Annex 2 Guideline Revision Rules

The rules that will apply in case of revisions of messages defined in this guideline 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.

[Blank]



2 Prevention of collision when making a right turn

- Service outline

At an intersection, information about oncoming vehicles or similar is provided to the driver of a vehicle waiting to make a right turn.

- Service scenario

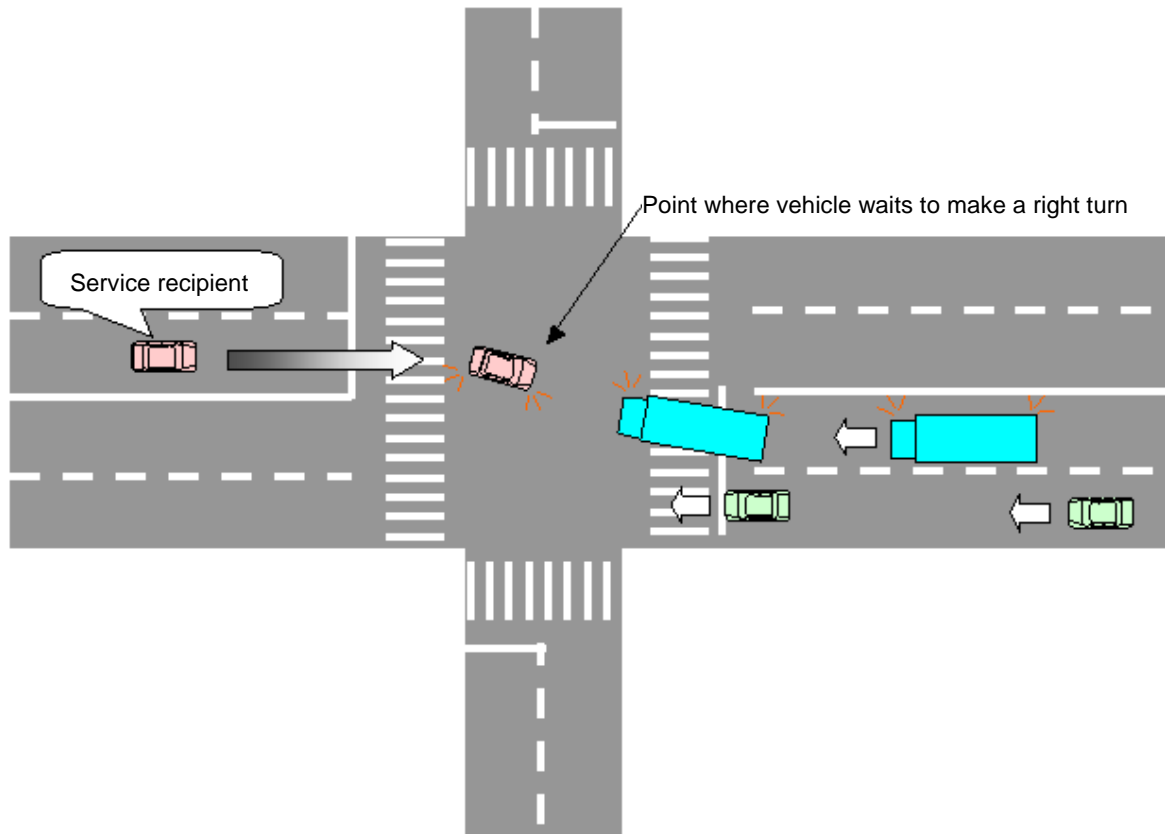


Figure S3-2 Service scenario for prevention of collision during right turn



### 3 Prevention of collision at intersection

- Service outline

At an intersection with a stop sign but no clear line of sight to the intersecting road, information about vehicles in the intersecting road is provided to the driver of a vehicle approaching the intersection.

- Service scenario

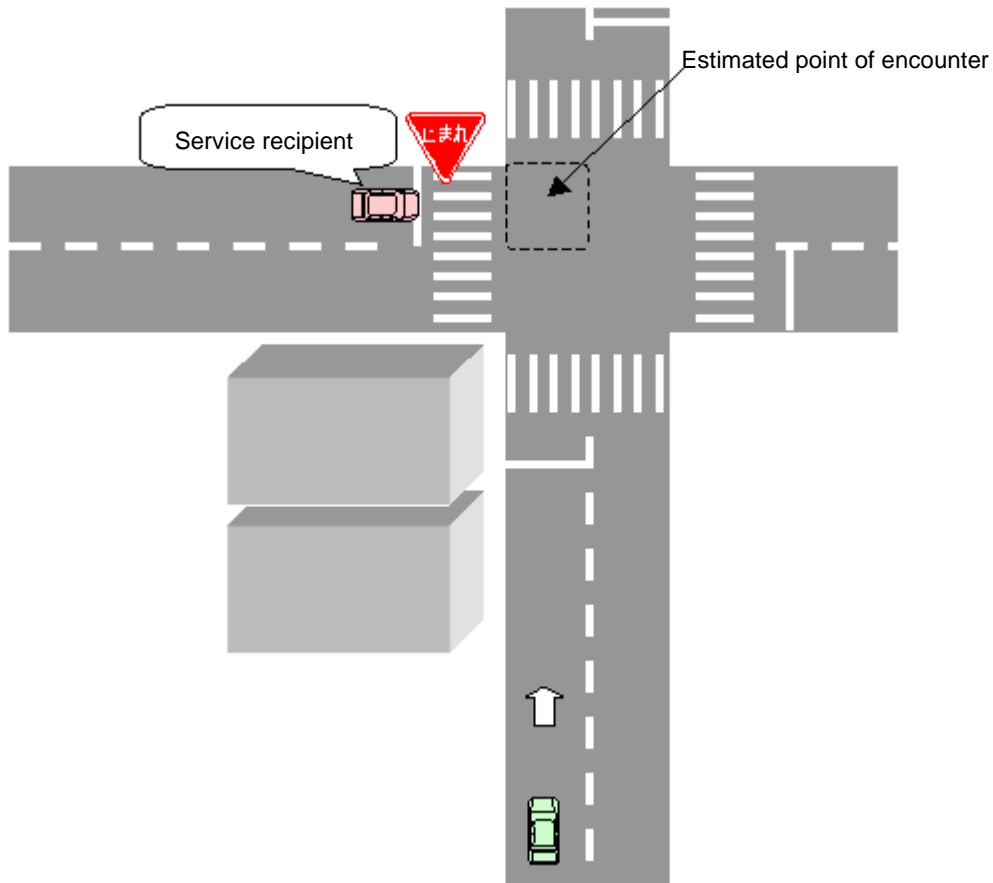


Figure S3-3 Service scenario for prevention of collision at intersection

#### 4 Provision of emergency vehicle information

- Service outline

Information about a vehicle on emergency duty is provided to drivers of vehicles in the vicinity.

- Service scenario

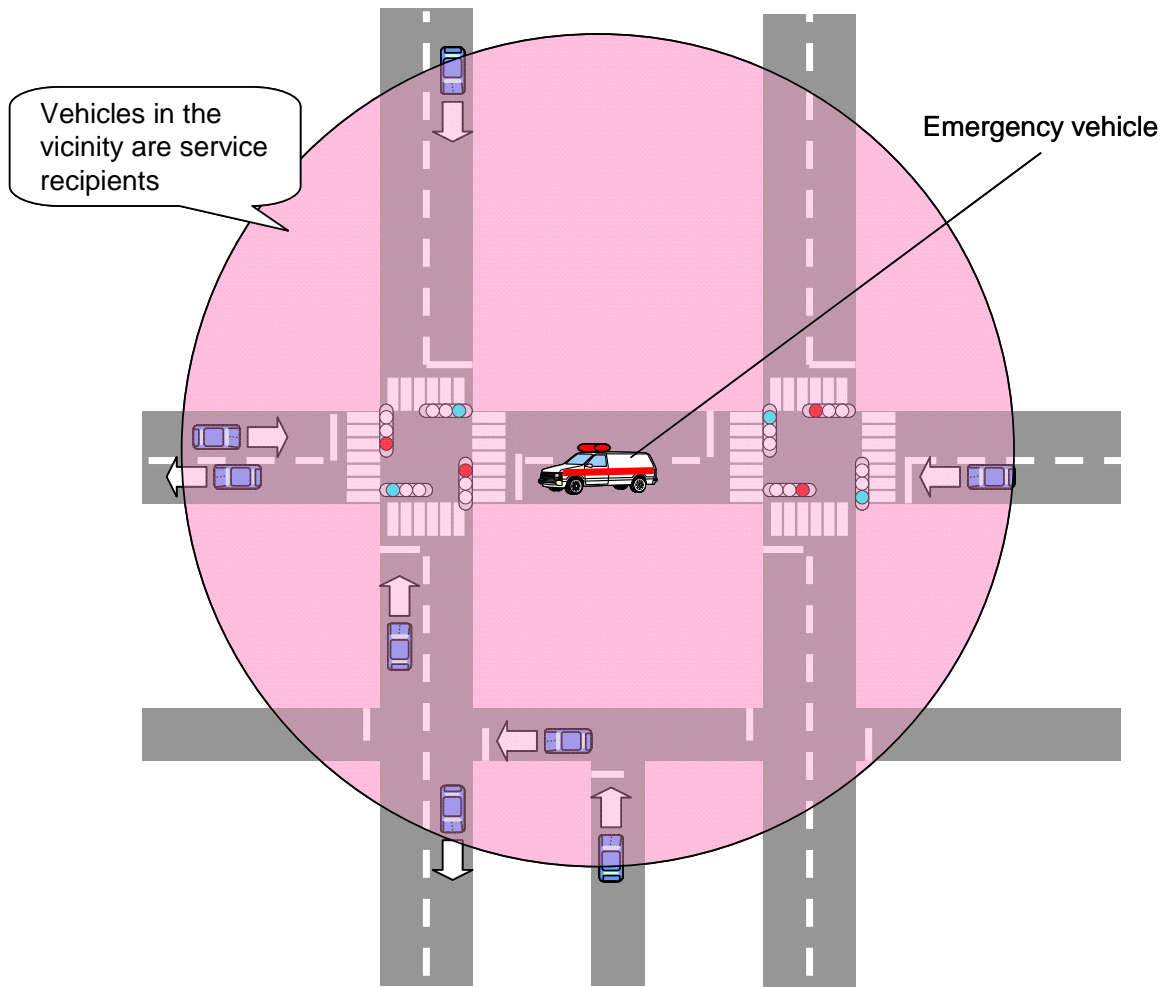


Figure S3-4 Service scenario for providing emergency vehicle information