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Errata Document for C-ITS Release 1

Release 1

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Contents

Intellectual Property Rights 4

Foreword 4

Modal verbs terminology 4

1 Scope 5

2 Impacted Deliverables 5

Corrections for ETSI TS 102 894-2 (V1.3.1): 6

Corrections for ETSI EN 302 637-2 (V1.4.1) 15

Corrections for ETSI EN 302 637-3 (V1.3.1) 25

Corrections for ETSI TS 103 301 (V1.3.1) 38

Corrections for ETSI EN 302 636-4-1 (V1.4.1) 44

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# Foreword

This ETSI Errata Document reflects the decisions of the ETSI Technical Body responsible for the referenced ETSI Deliverables, that are not yet published. It has therefore to be noted that for ENs the agreed corrections have not been through the ENAP procedure yet. The Errata Document has been produced by ETSI Technical Committee Intelligent Transport Systems – ETSI TC ITS.

# Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](https://portal.etsi.org/Services/editHelp%21/Howtostart/ETSIDraftingRules.aspx) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

# 1 Scope

The present ETSI Errata Document reflects not yet published decisions of the ETSI Technical Committee Intelligent Transport Systems who are responsible for the referenced ETSI deliverable.

This Errata Document covers C-ITS Release 1

It has to be noted that for deliverables of the type ENs he agreed corrections have not been through the ENAP procedure yet and thus could be subject to changes as part of the ENAP procedure.

Section 2 of this document list the ETSI deliverables and their version number to which corrections are contained in this document

# 2 Impacted Deliverables

Corrections to the following ETSI deliverables are contained in this Errata Document

[1] ETSI TS 102 894-2 (V1.3.1): "Intelligent Transport Systems (ITS); Users and applications requirements; Part 2: Applications and facilities layer common data dictionary".

[2] ETSI TS 102 941 (V1.3.1): "Intelligent Transport Systems (ITS); Security; Trust and Privacy Management".

[3] ETSI EN 302 637-2 (V1.4.1): "Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Part 2: Specification of Cooperative Awareness Basic Service ".

[4] ETSI EN 302 637-3 (V1.3.1): "Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Part 3: Specifications of Decentralized Environmental Notification Basic Service".

[5] ETSI TS 103 301 (V1.3.1): “Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Facilities layer protocols and communication requirements for infrastructure services; Release 2”

# Corrections for ETSI TS 102 894-2 (V1.3.1):

|  |
| --- |
| **Overview of Change Requests** |
| <Change Requesrt> | <Date> | <Title> |
| CR 102 894-2#001 | 12-07-19 | Correction of ASN.1 definition for Data Element [LanePosition ] |
| CR 102 894-2#002 | 05-08-20 | Harmonize the use of vehicle dimensions between ETSI Documents |
| CR 102 894-2#003 | 26-03-21 | Define the meaning of subCauseCode |
|  |  |  |

|  |
| --- |
| **CHANGE REQUEST** |
|  | TS 102 894-2 | **Version** | 1.3.1 | **CR** | 1 | **rev** | - |  |
|  |
| **CR Title** | Correction of ASN.1 definition for Data Element [LanePosition ]  |
|  |  |
| **Original Source** | ITS WG1 |
|  |  |
| **Work Item Ref** | RTS/ITS-00168 | **Submission date** | 21/03/2019 |
| **Approving TB**  | TC ITS | **Approval date** | 08/04/2019 |
| **Category:** | F | **Release** | 1 |  |
|  | Use **one** of the following categories:**F** (correction)**A** (correction in an earlier release)**B** (addition of feature) **C** (functional modification of feature)**D** (editorial modification) |  |
|  |  |
| **Reason for change** | In Annex B, ASN.1 definition of LanePosition is not in line with DE definition in Annex A.40 |
|  |  |
| **Consequence if not approved** | Wrong implementation of the base specification for the data element.  |
|  |  |
| **Summary of change** | In Annex A.40, outterHardShoulder should be outerHardShoulderChange LanePosition in Annex B to:LanePosition ::= INTEGER {offTheRoad(-1), innerHardShoulder(0),innermostDrivingLane(1), secondLaneFromInside(2), outerHardShoulder(14) } (-1..14) |
|  |  |
| **Clauses affected** | Annex B, Annex A.40 |
|  |  |
| **Linked Change Requests** |  |  |
|  |  |  |
|  |  |
| **Other comments** | Mantis issue 7789 and decision made in ITSWG1#47 meeting. <http://oldforge.etsi.org/mantis/view.php?id=7789>  |
|  |  |

### A.40 DE\_LanePosition

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

### Annex B (normative):

### ASN.1 module of the common data dictionary

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

|  |
| --- |
|  |
|  |
|  |
| LanePosition ::= INTEGER {offTheRoad(-1), innerHardShoulder(0),innermostDrivingLane(1), secondLaneFromInside(2), outerHardShoulder(14) } (-1..14) |

|  |
| --- |
| **CHANGE REQUEST** |
|  | ETSI TS 102 894-2 | **Version** | 1.3.1 | **CR** | *2* | **rev** | - |  |
|  |
| **CR Title** | Harmonize the use of vehicle dimensions between ETSI Documents |
|  |  |
| **Original Source** | ITS WG1 |
|  |  |
| **Work Item Ref** | RTS/ITS-00148 | **Submission date** | 02.06.2020 |
| **Approving TB**  | ITS | **Approval date** | 05.08.2020 |
| **Category:** | **F** | **Release** | 1 |  |
|  | Use **one** of the following categories:**F** (correction)**A** (correction in an earlier release)**B** (addition of feature) **C** (functional modification of feature)**D** (editorial modification) |  |
|  |  |
| **Reason for change** | There is an inconsistency between the EN 302 637-2 (CA Service), the TS 102 894-2 (CDD) and the EN 302 890-2 (PoTi). Whereas the CA-Service and the CDD state that the vehicle width DF (Clause B.36 in CA-Service; Clause A.95 in CDD) shall include the width of the vehicle ITS-S with side mirrors included, the PoTi EN (Clause 6.2.2) states that side mirrors are excluded. It is proposed to follow the interpretation of the PoTi EN as the detection of side mirrors is difficult for perception sensors from other vehicles. However, the vehicle width information could be used in data association algorithms. A vehicle following the vehicle ITS-S disseminating the e.g., CAM with this information is likely not to perceive the width including the side mirrors. |
|  |  |
| **Consequence if not approved** | Non-hamonized use of the vehicleWidth DE between different ITS-S due to contradicting specifications |
|  |  |
| **Summary of change** | Change wording in Clause A.95 of TS 102 894-2 to “Width of a vehicle, excluding side mirrors and possible similar extensions. For a vehicle width equal to or greater than6,1 metres, the value shall be set to 61. The value shall be set to 62 if the information is unavailable.” |
|  |  |
| **Clauses affected** | A.95 of TS 102 894-2 |
|  |  |
| **Linked Change Requests** | See above |  |
|  |  |  |
|  |  |
| **Other comments** |  |
|  |  |

1. 95 DE\_VehicleWidth

|  |  |
| --- | --- |
| **Descriptive Name** | VehicleWidth |
| **Identifier** | DataType\_ 95 |
| **ASN.1 representation** | VehicleWidth ::= INTEGER {tenCentimeters(1), outOfRange(61), unavailable(62)} (1..62) |
| **Definition** | ~~Width of a vehicle, including side mirrors. For a vehicle width equal to or greater than 6,1 metres, the value shall be set to 61. The value shall be set to 62 if the information is unavailable.~~Width of a vehicle, excluding side mirrors and possible similar extensions. For a vehicle width equal to or greater than 6,1 metres, the value shall be set to 61. The value shall be set to 62 if the information is unavailable. |
| **Unit**  | 0,1 metre |
| **Category** | Vehicle information |

|  |
| --- |
| **CHANGE REQUEST**  |
|  | ETSI TS 102 894-2 | **Version** | V1.3.1  | **CR** | 3 | **rev** | - |  |
|  |
| **CR Title** | Define the meaning of subCauseCode |
|  |  |
| **Original Source** | ITS WG 1 |
|  |  |
| **Work Item Ref** | REN/ITS-00168 | **Submission date** | 23/03/2021 |
| **Approving TB**  | ITS | **Approval date** | 26/03/2021 |
| **Category:** | **F** | **Release** | 1 |  |
|  | Use **one** of the following categories:**F** (correction)**A** (correction in an earlier release)**B** (addition of feature) **C** (functional modification of feature)**D** (editorial modification) |  |
|  |  |
| **Reason for change** | New subCauseCodes are generated by assigning names to integer values in a predefined fix range (0..255). The assignment of names is therefore in itself syntactically backwards compatible with “old receivers” because it does not involve any change to the message syntax. From a semantical perspective it is unclear however, what the expected behavior at the receiver is in case it receives a known causeCode and an unknown subCauseCode. |
|  |  |
| **Consequence if not approved** | Receivers will reject DENMs if the subCauseCode is unknown.  |
|  |  |
| **Summary of change** | Define the interpretation of the subCauseCode as optional. |
|  |  |
| **Clauses affected** | A.104 |
|  |  |
| **Linked Change Requests** | CR TS 102 894-2#0007 |  |
|  |  |  |
|  |  |
| **Other comments** | Also note the double semantics in the definition of DF\_CauseCode |
|  |  |

## A.104 DF\_CauseCode

|  |  |
| --- | --- |
| **Descriptive Name** | CauseCode |
| **Identifier** | DataType\_ 104 |
| **ASN.1 representation** | CauseCode ::= SEQUENCE {causeCode CauseCodeType,subCauseCode SubCauseCodeType,... } |
| Definition | Encoded value of a traffic event type. The DF shall include the following information:* causeCode: the main cause of a detected event. It shall be presented as defined in clause A.10 CauseCodeType,
* subCauseCode: the subordinate cause of a detected event. It shall be presented as defined in clause A.81 SubCauseCodeType.

The semantics of the entire DF are completely defined by the component causeCode. The interpretation of the subCauseCode may provide additional information that is not strictly necessary to understand the causeCode itself, and is therefore optional.The values of causeCodeType and subCauseCode are defined in clause 7.1.4 of ETSI EN 302 637-3 [i.3]. |
| **Unit** | N/A |
| **Category** | Traffic information |

# Corrections for ETSI EN 302 637-2 (V1.4.1)

|  |
| --- |
| **Overview of Change Requests** |
| <Change Requesrt> | <Date> | <Title> |
| CR 302 637-2#001 | 12-07-19 | Description of LanePosition in the CAM standard |
| CR 302 637-2#002 | 17-01-20 | Description of closedLanes in the CAM standard (B.43) |
| CR 302 637-2#003 | 05-08-20 | Harmonize the use of vehicle dimensions between ETSI Documents |
| CR 302 637-2#004 | 28-10-22 | Change CAM generation frequency for RSU ITS-S |

|  |
| --- |
| **CHANGE REQUEST** |
|  | ETSI EN 302 637-2 | **Version** | 1.4.1 | **CR** | 1 | **rev** | - |  |
|  |
| **CR Title** | Description of LanePosition in the CAM standard |
|  |  |
| **Original Source** | ITS WG1 |
|  |  |
| **Work Item Ref** | REN/ITS-0010089 | **Submission date** | 22/03/2019 |
| **Approving TB**  | TC ITS | **Approval date** | 08/04/2019 |
| **Category:** | **F** | **Release** | 1 |  |
|  | Use **one** of the following categories:**F** (correction)**A** (correction in an earlier release)**B** (addition of feature) **C** (functional modification of feature)**D** (editorial modification) |  |
|  |  |
| **Reason for change** | The description of LanePosition is not in line with the description of LanePosition in CDD. The CAM standard defines counting lanes from outside to inside and the CDD defines counting from inside to outside. It is unclear which definition of LanePosition prevails. |
|  |  |
| **Consequence if not approved** | It is unclear how to interpret the information provided on the lane the vehicle is in. This could lead to wrong interpretations and wrong advice to drivers. |
|  |  |
| **Summary of change** | The CAM standard should not re-define what is already defined elsewhere. Hence delete the last part of the first sentence in B.24The DE lanePosition of the *referencePosition* of a vehicle, ~~counted from the~~~~outside border of the road, in the direction of the traffic flow.~~ |
|  |  |
| **Clauses affected** | B.24 |
|  |  |
| **Linked Change Requests** | CR 102 894-2 - #0001 Correction of ASN.1 definition for Data Element [LanePosition ]. |  |
|  |  |  |
|  |  |
| **Other comments** | See similar CR for the DENM standard. |
|  |  |

### B.24 lanePosition

|  |  |
| --- | --- |
| Description | The DE lanePosition of the *referencePosition* of a vehicle.This DE shall be present if the data is available at the originating ITS-S (see note). |
| Data setting and presentation requirements | The DE shall be presented as specified in ETSI TS 102 894-2 [2] *LanePosition.* |
| NOTE: Additional information is needed to unambiguously identify the lane position and to allow the correlation to a map. |

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| **CHANGE REQUEST** |
|  | ETSI EN 302 637-2 | **Version** | 1.4.1 | **CR** | 2 | **rev** | - |  |
|  |
| **CR Title** | Description of closedLanes in the CAM standard (B.43) |
|  |  |
| **Original Source** | ITS WG1 |
|  |  |
| **Work Item Ref** | REN/ITS-0010089 | **Submission date** | 20/11/2019 |
| **Approving TB**  | TC ITS | **Approval date** | 17/01/2020 |
| **Category:** | **F** | **Release** | 1 |  |
|  | Use **one** of the following categories:**F** (correction)**A** (correction in an earlier release)**B** (addition of feature) **C** (functional modification of feature)**D** (editorial modification) |  |
|  |  |
| **Reason for change** | The description of closedLines is not in line with the description of ClosedLines (A.106 and A.23) in CDD. |
|  |  |
| **Consequence if not approved** | It is unclear how to interpret the information provided on the closed lanes. This could lead to wrong interpretations and wrong advice to drivers. |
|  |  |
| **Summary of change** | The CAM standard should not re-define what is already defined elsewhere. Hence delete the part of the B.43 as it is already defined in CDD in A.106 and A.23 |
|  |  |
| **Clauses affected** | B.43 |
|  |  |
| **Linked Change Requests** | CR 102 894-2 - #0001 Correction of ASN.1 definition for Data Element [LanePosition ]. |
|  | CR 302 637-2 - #0001 Description of LanePosition in the CAM standard. |
|  |  |
| **Other comments** | See similar CR for the LanePosition DE. |
|  |  |

### B.43

It provides information about the opening/closure status of the lanes ahead. ~~Lanes are counted from the outside boarder of the road. If a lane is closed to traffic, the corresponding bit shall be set to 1.~~

|  |
| --- |
| **CHANGE REQUEST** |
|  | ETSI EN 302 637-2 | **Version** | 1.4.1 | **CR** | *3* | **rev** | - |  |
|  |
| **CR Title** | Harmonize the use of vehicle dimensions between ETSI Documents |
|  |  |
| **Original Source** | ITS WG1 |
|  |  |
| **Work Item Ref** | REN/ITS-0010089 | **Submission date** | 02.06.2020 |
| **Approving TB**  | ITS | **Approval date** | 05.08.2020 |
| **Category:** | **F** | **Release** | 1 |  |
|  | Use **one** of the following categories:**F** (correction)**A** (correction in an earlier release)**B** (addition of feature) **C** (functional modification of feature)**D** (editorial modification) |  |
|  |  |
| **Reason for change** | There is an inconsistency between the EN 302 637-2 (CA Service), the TS 102 894-2 (CDD) and the EN 302 890-2 (PoTi). Whereas the CA-Service and the CDD state that the vehicle width DF (Clause B.36 in CA-Service; Clause A.95 in CDD) shall include the width of the vehicle ITS-S with side mirrors included, the PoTi EN (Clause 6.2.2) states that side mirrors are excluded. It is proposed to follow the interpretation of the PoTi EN as the detection of side mirrors is difficult for perception sensors from other vehicles. However, the vehicle width information could be used in data association algorithms. A vehicle following the vehicle ITS-S disseminating the e.g., CAM with this information is likely not to perceive the width including the side mirrors. |
|  |  |
| **Consequence if not approved** | Non-hamonized use of the vehicleWidth DE between different ITS-S due to contradicting specifications |
|  |  |
| **Summary of change** | Change wording in Clause B.36 of EN 302 637-2 to “Vehicle width of the vehicle ITS-S that originates the CAM, excluding side mirrors and possible similar extensions.” |
|  |  |
| **Clauses affected** | B.36  |
|  |  |
| **Linked Change Requests** | See below |  |
|  |  |  |
|  |  |
| **Other comments** |  |
|  |  |

## B.36 vehicleWidth

**Change to:**

|  |  |
| --- | --- |
| Description | ~~Vehicle width, measured of the vehicle ITS-S that originates the CAM, including side mirrors.~~Vehicle width of the vehicle ITS-S that originates the CAM, excluding side mirrors and possible similar extensions.” |
| Data setting and presentation requirements | The DE shall be presented as specified inETSI TS 102 894-2 [2] *VehicleWidth.* |

|  |
| --- |
| **CHANGE REQUEST** |
|  | ETSI EN 302 637-2 | **Version** | 1.4.1 | **CR** | *4* | **rev** | - |  |
|  |
| **CR Title** | Change CAM generation frequency for RSU ITS-S |
|  |  |
| **Original Source** | ITS WG1 |
|  |  |
| **Work Item Ref** | REN/ITS-0010089 | **Submission date** | *25.10.2022* |
| **Approving TB**  | ITS | **Approval date** |  |
| **Category:** | **F** | **Release** | 1 |  |
|  | Use **one** of the following categories:**F** (correction)**A** (correction in an earlier release)**B** (addition of feature) **C** (functional modification of feature)**D** (editorial modification) |  |
|  |  |
| **Reason for change** | Currently the standard states: “The CAM generation frequency for RSU ITS-Ss defined by the time interval between two consecutive CAM generations shall be set in such a way, that at least one CAM is transmitted while a vehicle is in the communication zone of the RSU ITS-S. ***The time interval shall be greater than or equal to 1 000 ms. This corresponds to a maximum CAM generation rate of 1 Hz****.*”In this way, an RSU can never answer to the TS 103 097 *inlineP2pcdRequest* for an unknown authorization authority certificate, because each CAM shall contain the ITS-S´ own Authorization Ticket, which is to be sent at least once per second.Therefore it is necessary to be allowed to increase the transmission rate of I2V CAMs to above 1Hz.  |
|  |  |
| **Consequence if not approved** | The RSU cannot provide the unknown authorization authority certificate to the vehicle. The vehicle cannot verify the certificate chain of Infrastructure messages specified in TS 103 301. |
|  |  |
| **Summary of change** | Change wording to:“*The CAM generation frequency for RSU ITS-Ss defined by the time interval between two consecutive CAM generations shall be set in such a way, that at least one CAM is transmitted while a vehicle is in the communication zone of the RSU ITS-S* ***and that an inlineP2pcdRequest for an unknown authorization authority certificate from that same vehicle can be answered according to TS 103 097 [5] at least once thereafter****. The time interval shall be greater than or equal to 500ms.**~~The time interval shall be greater than or equal to 1 000 ms. This corresponds to a maximum CAM generation rate of 1 Hz~~.*” |
|  |  |
| **Clauses affected** | 6.1.4  |
|  |  |
| **Linked Change Requests** |  |  |
|  |  |  |
|  |  |
| **Other comments** |  |
|  |  |

# Corrections for ETSI EN 302 637-3 (V1.3.1)

|  |
| --- |
| **Overview of Change Requests** |
| <Change Requesrt> | <Date> | <Title> |
| CR 302 637-3#001 | 12-07-19 | Description of LanePosition in the DENM standard |
| CR 302 637-3#002 | 12-07-19 | Type of ServiceSpecificPermissions in the DENM standard |
| CR 302 637-3#003 | 26-03-2021 | Corrections to table 10 of EN 302 637-3 |
| CR 302 637-3#004 | 26-03-2021 | Description of relevanceDistance in the DENM standard |

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| --- |
| **CHANGE REQUEST** |
|  | ETSI EN 302 637-3 | **Version** | 1.3.1 | **CR** | 1 | **rev** | - |  |
|  |
| **CR Title** | Description of LanePosition in the DENM standard |
|  |  |
| **Original Source** | ITS WG1 |
|  |  |
| **Work Item Ref** | REN/ITS-0010090 | **Submission date** | 22/03/2019 |
| **Approving TB**  | TC ITS | **Approval date** | 08/04/2019 |
| **Category:** | **F** | **Release** | 1 |  |
|  | Use **one** of the following categories:**F** (correction)**A** (correction in an earlier release)**B** (addition of feature) **C** (functional modification of feature)**D** (editorial modification) |  |
|  |  |
| **Reason for change** | The description of LanePosition is not in line with the description of LanePosition in CDD. The DENM standard defines counting lanes from outside to inside and the CDD defines counting from inside to outside. It is unclear which definition of LanePosition prevails. |
|  |  |
| **Consequence if not approved** | It is unclear how to interpret the information related to the lane of the event. This could lead to wrong interpretations and wrong advice to drivers. |
|  |  |
| **Summary of change** | Delete the last part of the first sentence in B.24The lane position of the event position in the road ~~counted from the outside~~~~boarder of the road.~~ |
|  |  |
| **Clauses affected** | B.24 |
|  |  |
| **Linked Change Requests** | CR 102 894-2 - #0001 Correction of ASN.1 definition for Data Element [LanePosition ]. |  |
|  |  |  |
|  |  |
| **Other comments** | See similar CR for the CAM standard. |
|  |  |

### B.24 lanePosition

|  |  |
| --- | --- |
| Description | The lane position of the event position in the road.This DE in included in the *alacarte* container.If this data is provided, the originating ITS-S is required to determine the lane position with a predefined confidence level as defined by the ITS applications (e.g. 95 %). |
| Data setting and presentation requirements | This DE is OPTIONAL. It shall be present when this information is required by the ITS application. This DE shall be presented as specified in ETSI TS 102 894-2 [5] *LanePosition*. |

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| --- |
| **CHANGE REQUEST** |
|  | ETSI EN 302 637-3 | **Version** | 1.3.1 | **CR** | 2 | **rev** | - |  |
|  |
| **CR Title** | Type of ServiceSpecificPermissions in the DENM standard |
|  |  |
| **Original Source** | ITS WG5 |
|  |  |
| **Work Item Ref** | REN/ITS-0010090 | **Submission date** | 22/03/2019 |
| **Approving TB**  | ITS | **Approval date** | 08/04/2019 |
| **Category:** | **F** | **Release** | 1 |  |
|  | Use **one** of the following categories:**F** (correction)**A** (correction in an earlier release)**B** (addition of feature) **C** (functional modification of feature)**D** (editorial modification) |  |
|  |  |
| **Reason for change** | There are two options for specifying SSPs in TS 103 097. The DENM standard does not state which one to use. |
|  |  |
| **Consequence if not approved** | If it is not clarified which one option be used, this could cause interoperability problems if sending and receiving implementations use different options. The permissions could potentially not be decoded and hence DENMs cannot be validated from a security/permissions point of view. |
|  |  |
| **Summary of change** | 1. Add the following sentence to 6.2.2.2:

*DENMs shall be signed using private keys associated to Authorization Tickets that contain SSPs of type BitmapSsp as specified in ETSI TS 103 097 (V1.3.1) [9].*1. Move reference [i.17] to the normative references as reference [9]
 |
|  |  |
| **Clauses affected** | 2.1 and 6.2.2.2 |
|  |  |
| **Linked Change Requests** |  |  |
|  |  |  |
|  |  |
| **Other comments** | The same change has already been done in the CAM standard clause 6.2.2.2 during the ENAP comment resolution. |
|  |  |

### 6.2.2.2 Service Specific Permissions (SSP)

The octet scheme allows the SSP format to accommodate current and future versions of the present document. The octet scheme for DENM SSP is constructed out of four octets as illustrated in Figure 4.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 |  |  |  |  |  |  |  | 1 |  |  |  |  |  |  |  | 2 |  |  |  |  |  |  |  | 3 |  |  |  |  |  |  |  |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Octet 0 | Octet 1 | Octet 2 | Octet 3 |

Figure 4: Format for the Octets

EXAMPLE of bit order: The decimal value 199 shall be represented as shown in Figure 5.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 |

Figure 5: Example of octet presentation

For each octet, the most significant bit (MSB) shall be the leftmost bit. The transmission order shall always be the MSB first. The first octet (octet 0 in Figure 4) shall control the SSP version and be interpreted in the following way:

 0: No version, length 1 octet; the value shall only be used for testing purposes.

 1: First version, length 4 octets.

 2 to 255: Reserved for Future Usage.

The SSP has a maximum length as specified in ETSI TS 103 097 [i.17]. The first octet shall reflect the version of the present document. As future versions of the present document are published, the first octet shall be accordingly incremented. The second to fourth octet (octet 1 to octet 3 in Figure 4) is based on the *causeCode* types described in the clause 7.1.4.

Length of SSP is the length of the Octet String. Table 8 presents the octet scheme for DENM SSPs.

When the ITS Application Identifier (ITS-AID) is set for the DEN basic service, the permissions shall be as defined in Table 9.

DENMs shall be signed using private keys associated to Authorization Tickets that contain SSPs of type BitmapSsp as specified in ETSI TS 103 097 (V1.3.1) [9].

Table 8: Octet Scheme for DENM SSPs

|  |  |
| --- | --- |
| Octet # | Description |
| 0 | SSP version control |
| 1 to 3 | Service-specific parameter |
| 4 to 30 | Reserved for Future Usage |

………………..

### 2 References

### 2.1 Normative references

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

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

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

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

[1] SAE J2735 (2009-11-19): "Dedicated Short Range Communications (DSRC) Message Set Dictionary".

…………………..

[9] ETSI TS 103 097 (V1.3.1): "Intelligent Transport Systems (ITS); Security; Security header and certificate formats".

### 2.2 Informative references

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

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

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

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

……………….

 [i.17] Void.

[i.18] ETSI TR 102 965 (V1.1.1): "Intelligent Transport Systems (ITS); Application object identifier (ITS-AID); Registration list".

|  |
| --- |
| **CHANGE REQUEST** |
|  | ETSI EN 302 637-3 | **Version** | 1.3.1 | **CR** | 3 | **rev** | - |  |
|  |
| **CR Title** | Corrections to table 10 of EN 302 637-3 |
|  |  |
| **Original Source** | ITS WG1 |
|  |  |
| **Work Item Ref** | REN/ITS-0010090 | **Submission date** | 23/03/2021 |
| **Approving TB**  | ITS | **Approval date** | 26/03/2021 |
| **Category:** | **F** | **Release** | 1 |  |
|  | Use **one** of the following categories:**F** (correction)**A** (correction in an earlier release)**B** (addition of feature) **C** (functional modification of feature)**D** (editorial modification) |  |
|  |  |
| **Reason for change** | Cause code 5 and 7, as well sub-cause code 9 of cause code 91 are specified in the CDD standard TS 102 894-2 but are missing in EN 302 637 3. |
|  |  |
| **Consequence if not approved** | The missing cause codes and sub cause codes cannot be used in deployments because of the uncertainty arising from misaligned standards. |
|  |  |
| **Summary of change** | amendments to table 10 |
|  |  |
| **Clauses affected** | **7.1.4** |
|  |  |
| **Linked Change Requests** | None |  |
|  |  |  |
|  |  |
| **Other comments** | None |
|  |  |

### 7.1.4 DENM situation container

….

Table 10: Cause description and cause code assignment for ETSI use case

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Cause code description** | **Direct cause code** | **Mapping with TPEG-TEC** | **Sub cause code** | **Sub cause description** |
| Roadworks | 3 | Specified as road works in *tec002* of clause 9.2 in TISA TAWG11071 [xx] | 0 | Unavailable |
|  | 1 to 3 | As specified in *tec103* of clause 9.13 in TISA TAWG11071 [xx] |
|  | 4 | Short-term stationary roadWorks |
|  | 5 | Street cleaning |
|  | 6 | Winter service |
| Impassability | 5 |  | 0 | Unavailable |
| Adverse weather condition - adhesion | 6 | Specified as slippery road in *tec002* of clause 9.2 in TISA TAWG11071 [xx] | 0 | Unavailable |
|  | 1 to 10 | As specified in *tec106* of clause 9.16 in TISA TAWG11071 [xx] |
| aquaplaning | 7 | - | 0 | Unavailable |

….

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Vehicle breakdown | 91 | Values are assigned referring to ETSI TS 101 539-1 [xx], clause 6.3.3 | 0 | Unavailable |
|  |  |  | 1 | Lack of fuel |
|  |  |  | 2 | Lack of battery |
|  |  |  | 3 | Engine problem |
|  |  |  | 4 | Transmission problem |
|  |  |  | 5 | Engine cooling problem |
|  |  |  | 6 | Braking system problem |
|  |  |  | 7 | Steering problem |
|  |  |  | 8 | Tyre puncture |
|  |  |  | 9 | tyrePressureProblem |

|  |
| --- |
| **CHANGE REQUEST**  |
|  | ETSI EN 302 637-3 | **Version** | 1.3.1 | **CR** | 4 | **rev** | - |  |
|  |
| **CR Title** | Description of relevanceDistance in the DENM standard |
|  |  |
| **Original Source** | ITS WG 1 |
|  |  |
| **Work Item Ref** |  | **Submission date** |  |
| **Approving TB**  | ITS | **Approval date** | 02.07.2021 |
| **Category:** | **F** | **Release** | 1 |  |
|  | Use **one** of the following categories:**F** (correction)**A** (correction in an earlier release)**B** (addition of feature) **C** (functional modification of feature)**D** (editorial modification) |  |
|  |  |
| **Reason for change** | The current description of the relevanceDistance in the DENM standard limits its application to events detected at a single event position (punctual event). For some use cases, an event can be detected on an area (area-based event) and can be described in a DENM with a combination of event position and event history points. As a consequence, the relevanceDistance description should be modified to indicate the distance from the event position or from any of the event history points. The C2C-CC is currently proposing an approach for setting the DENM GeoBroadcast DestinationArea that would benefit from this modified description of the relevanceDistance to optimally serve use cases with area-based events |
|  |  |
| **Consequence if not approved** | If not approved, it would be impossible to explicitly indicate the relevanceDistance to event points of a DENM eventHistory. As a consequence, misinterpretations of the relevanceDistance would occur when dealing with use cases making use of DENMs for area-based events.  |
|  |  |
| **Summary of change** | Slightly extend the relevanceDistance definition in section B.38 in the following way:The distance in which event information is relevant for the receiving ITS-S,starting from the event position or from any of the event history points as defined in clause 6.1.3.1Additionally, insert the following note in clause 6.1.3.1Note: If a DENM contains an eventHistory DF, multiple relevance areas exist. One area is located at the eventPosition DF and each point in the eventHistory DF creates an additional, individual relevance area.Finally, for making sure that a destination area including multiple relevance areas is used for KAF forwarding, the following note is proposed in clause 8.3.2.7. The note implicitly assumes that the DENM originator sets the destination area in a way to cover all the relevance areas of the notification, so that the KAF forwarder can reuse them.Note: Especially for DENMs with an eventHistory DF, it is recommended to buffer the original DENM’s destination area for possible reuse in KAF forwarding. |
|  |  |
| **Clauses affected** | B.38, clause 6.1.3.1, clause 8.3.2.7 |
|  |  |
| **Linked Change Requests** |  |  |
|  |  |  |
|  |  |
| **Other comments** | The current relevanceDistance formulation in ETSI TS 102 894-2 is compatible with the new formulation and does not need to be modified |
|  |  |

### B.38 RelevanceDistance

|  |  |
| --- | --- |
| Description | The distance in which event information is relevant for the receiving ITS-S,starting from the event position or from any of the event history points as defined in clause 6.1.3.1 |
| Data setting and presentation requirements | This DE is OPTIONAL. It shall be present when the information is required bythe ITS application.This DE shall be presented as specified in ETSI TS 102 894-2 [5]*RelevanceDistance.* |

6.1.3.1 DENM relevance area
A DENM should be disseminated to as many ITS-Ss as possible located in an area of relevance, denoted as relevance
area. This includes ITS-Ss entering the relevance area until the validityDuration and ITS-Ss that have no connectivity to
the originating ITS-S when the DENM is transmitted.
The relevance area is set by the ITS-S application of the originating ITS-S and shall be included in the DENM when the
information is available. A receiving ITS-S may make use of the relevance area information to realize the relevance
check.
According to the event type and the event location, the size and the shape of the relevance area varies. In the present
document, following information shall be used as the relevance area information:

* relevanceDistance: The distance within which the event is considered relevant to the receiving ITS-S.
* relevanceTrafficDirection: The traffic direction along which the receiving ITS-Ss may encounter the event.
Therefore, it is also the direction along which the DENM should be disseminated. As an example, for an
accident on a motorway, the relevant traffic direction of a DENM related to the event may be the upstream
direction of the accident location. While for the accident occurred in rural two-way roads, the
relevanceTrafficDirection may be both traffic directions (including also the opposite carriageway).

The relevanceDistance and the relevanceTrafficDirection shall be as specified in Annex A.

Note: If a DENM contains an eventHistory DF, multiple relevance areas exist. One area is located at the eventPosition DF and each point in the eventHistory DF creates an additional, individual relevance area.

8.3.2.7 DENM reconstruction
When a DENM is being forwarded, the DEN basic service shall reconstruct the DENM before forwarding it to the ITS
networking & transport layer. For this reconstruction, the management container, situation container, location container
and à la carte container of the DENM shall not be modified. The ITS PDU header shall be replaced by the ITS PDU
header constructed by the forwarding ITS-S

Note: Especially for DENMs with an eventHistory DF, it is recommended to buffer the original DENM’s destination area for possible reuse in KAF forwarding.

# Corrections for ETSI TS 103 301 (V1.3.1)

|  |
| --- |
| **Overview of Change Requests** |
| <Change Requesrt> | <Date> | <Title> |
| CR 103 301#001 | 3-07-20 | Correct the SSP version control for the GPC service |
| CR 103 301#002 | 22-01-21 | Correct Reference in CPS\_003 |
|  |  |  |
|  |  |  |

|  |
| --- |
| **CHANGE REQUEST** |
|  | ETSI TS 103 301 | **Version** | 1.3.1 | **CR** | *1* | **rev** | - |  |
|  |
| **CR Title** | Correct the SSP version control for the GPC service |
|  |  |
| **Original Source** | ITS WG1 |
|  |  |
| **Work Item Ref** | RTS/ITS-00181 | **Submission date** | 19.05.2020 |
| **Approving TB**  | ITS | **Approval date** | 03.07.2020 |
| **Category:** | **F** | **Release** | 1 |  |
|  | Use **one** of the following categories:**F** (correction)**A** (correction in an earlier release)**B** (addition of feature) **C** (functional modification of feature)**D** (editorial modification) |  |
|  |  |
| **Reason for change** | The SSP version control for the GPC service is set to value0.This is not possible as the value 0 is reserved for testing only and the value for SSP version control should start at value 1 in a published TS.  |
|  |  |
| **Consequence if not approved** | in a real deployment an ITS-S which receives RTCMEM messages with version 0 in the signing certificate migh drop the received messages. |
|  |  |
| **Summary of change** | Change value of SSP version control to 1 in table 25. |
|  |  |
| **Clauses affected** | 9.4.3.2 |
|  |  |
| **Linked Change Requests** | - |  |
|  |  |  |
|  |  |
| **Other comments** |  |
|  |  |

#### 9.4.3.2 GPC service communication requirements for short range access technologies

……………………

Table : Octet Scheme for GPC service SSPs

|  |  |  |
| --- | --- | --- |
| Octet # | Description | Value |
| 0 | SSP version control | ~~0~~1 |

|  |
| --- |
| **CHANGE REQUEST** |
|  | ETSI TS 103 301 | **Version** | 1.3.1 | **CR** | *2* | **rev** | - |  |
|  |
| **CR Title** | Correct Reference in CPS\_003 |
|  |  |
| **Original Source** | ITS WG1 |
|  |  |
| **Work Item Ref** | RTS/ITS-00181 | **Submission date** | 12.12.2020 |
| **Approving TB**  | ITS | **Approval date** | 18.01.2021 |
| **Category:** | **F** | **Release** | 1 |  |
|  | Use **one** of the following categories:**F** (correction)**A** (correction in an earlier release)**B** (addition of feature) **C** (functional modification of feature)**D** (editorial modification) |  |
|  |  |
| **Reason for change** | The referenced Standard **IEEE 802.11 2012 ah** defines Sub-1-GHz usage aka “WIFI HaLow” for IOT Applications. In Europe this is 873 – 870 MHz plus possible extension 915 – 921 MHz (see ETSI TR 103 245). This does not match the intended Communication parameter setting(CPS\_003)The reference shall point to the latest rollup version IEEE80211-2016, where all amendments are joined.The title of this CPS is not correct: “Transmission of **ADU over WLAN 5,8 GHz** in infrastructure mode (ISM)” |
|  |  |
| **Consequence if not approved** | CPS\_003 cannot be used due to misleading references. |
|  |  |
| **Summary of change** | Change title in 11.1 and 11.5 to **“ADU over WLAN 5 GHz”** and reference to rollup version **“IEEE 802.11-2016”** |
|  |  |
| **Clauses affected** | 11.1 and 11.5 |
|  |  |
| **Linked Change Requests** | - |  |
|  |  |  |
|  |  |
| **Other comments** |  |
|  |  |

##

 […]

##

# Corrections for ETSI EN 302 636-4-1 (V1.4.1)

|  |
| --- |
| **Overview of Change Requests** |
| <Change Requesrt> | <Date> | <Title> |
| CR 302 636-4-1#001 | 23-10-20 | Missing step in clause 10.3.12.3 added |
| CR 302 636-4-1#002 | 21-01-22 | Soft-state IS\_NEIGHBOUR flag |
|  |  |  |
|  |  |  |

|  |
| --- |
| **CHANGE REQUEST** |
|  | EN 302 636-4-1 | **Version** | 1.4.1 | **CR** | 1 | **rev** | - |  |
|  |
| **CR Title** | Missing step in GAC Forwarder and receiver operations |
|  |  |
| **Original Source** | ITS WG3 |
|  |  |
| **Work Item Ref** | REN-ITS-00358 | **Submission date** | 22/10/2020 |
| **Approving TB**  | ITS | **Approval date** | 23/10/2020 |
| **Category:** | **F** | **Release** | 1 |  |
|  | Use **one** of the following categories:**F** (correction)**A** (correction in an earlier release)**B** (addition of feature) **C** (functional modification of feature)**D** (editorial modification) |  |
|  |  |
| **Reason for change** | Missing step between step 10 and step 11 for section 10.3.12.3 Forwarder and receiver operations (for GAC) to execute the forwarding algorithm |
|  |  |
| **Consequence if not approved** | Inconsistent description of operations up to possibly incomplete implementation of forwarder and receiver operations |
|  |  |
| **Summary of change** | Add missing step |
|  |  |
| **Clauses affected** | 10.3.12.3 |
|  |  |
| **Linked Change Requests** | n/a |  |
|  |  |  |
|  |  |
| **Other comments** |  |
|  |  |

10.3.12.3 Forwarder and receiver operations

On reception of a GAC packet, the GeoAdhoc router shall execute the following operations:

1) *Basic Header* processing (clause 10.3.3);

[…]

10) if  (GeoAdhoc router is outside the geographical area):

a) decrement the *RHL* value:

i) if *RHL* = 0, discard the packet and omit the execution of further steps;

ii) if *RHL* > 0, update the field of the *Basic Header*, i.e. the *RHL* field with the decremented *RHL* value;

b) if no neighbour exists, i.e. the LocT does not contain a LocTE with the *IS\_NEIGHBOUR* flag set to TRUE, and SCF for the traffic class in the *TC* field of the *Common Header* is set, buffer the GAC packet in the *BC forwarding packet buffer* and omit the execution of further steps;

NOTE 2: If the GeoAdhoc router is outside the geographical area, the GN-PDU will not be passed to the upper layer entity.

11) execute the forwarding algorithm selection procedure (annex D);

12) if the return value of the forwarding algorithm is 0 (packet is buffered in a forwarding packet buffer) or -1 (packet is discarded), omit the execution of further steps;

13) execute media-dependent procedures; if the GN protocol constant itsGnIfType is set to:

a) UNSPECIFIED then no media-dependent procedures are specified;

b) for other values of itsGnIfType media dependent procedures may be defined elsewhere;

14) pass the GN-PDU to the LL protocol entity via the IN interface and set the destination address to the LL address of the next hop LL\_ADDR\_NH.

|  |
| --- |
| **CHANGE REQUEST** |
|  | ETSI EN 302 636-4-1 | **Version** | 1.4.1 | **CR** | 2 | **rev** |  |  |
|  |
| **CR Title** | Soft-state IS\_NEIGHBOUR flag |
|  |  |
| **Original Source** | Raphael Riebl (Technische Hochschule Ingolstadt), Q. Delooz (Halmstad University) |
|  |  |
| **Work Item Ref** | REN/ITS-00358 | **Submission date** | *20.01.2022* |
| **Approving TB**  | ITS | **Approval date** | *21.01.2022* |
| **Category:** | **F** | **Release** | 1 |  |
|  | Use **one** of the following categories:**F** (correction)**A** (correction in an earlier release)**B** (addition of feature) **C** (functional modification of feature)**D** (editorial modification) |  |
|  |  |
| **Reason for change** | IS\_NEIGHBOUR flag is never reset to FALSE |
|  |  |
| **Consequence if not approved** | LocTEs can be erroneously considered as direct neighbours and thus adversely affect packet handling and forwarding algorithms |
|  |  |
| **Summary of change** | Turn IS\_NEIGHBOUR flag into a soft-state attribute |
|  |  |
| **Clauses affected** | 8.1.2, Annex H |
|  |  |
| **Linked Change Requests** |  |  |
|  |  |  |
|  |  |
| **Other comments** |  |
|  |  |

## Problem description

During packet handling (section 10.3), the IS\_NEIGHBOUR flag is never set to FALSE for an already existing LocTE. As long as a LocTE remains valid (see *itsGnLifetimeLocTE*), a station remains marked as direct neighbour if it has been within radio range once. LocTE updates may continuously extend the entry’s lifetime even if the station’s packets are only received indirectly via forwarders. Thus, a LocTE belonging to a moving-away station may be kept with IS\_NEIGHBOUR set for a long period. Any operation evaluating IS\_NEIGHBOUR may thus be flawed.

## Proposed change

The IS\_NEIGHBOUR flag itself shall become soft state, i.e., reset to FALSE if it has not been set to TRUE for a while.

1. In section 8.1.2, add to the description of the IS\_NEIGHBOUR flag: “The flag is soft-state, i.e., falls back to FALSE if not set to TRUE again for a duration of *itsGnNeighbourFlagExpiry*.”
2. Add the novel protocol constant *itsGnNeighbourFlagExpiry* to Annex H. A reasonable default duration is *itsGnBeaconServiceRetransmitTimer* + *itsGnBeaconServiceMaxJitter* (= 3.75s).

## Backward compatibility

1. Q: What is the impact if a station does not implement this functionality, i.e., the IS\_NEIGHBOR Flag is not reset? What would be the consequences and which implications does it have?

A: In this case this station considers other stations as neighbours, i.e., being in direct communication range even though they are already (considerably) out of range. This wrong behavior effects all forwarding algorithms that evaluate/make us of the IS\_NEIGHBOR flag.
2. Q: What are the effects if stations with two different implementations exist, i.e. one resets the IS\_NEIGHBOR Flag and the other does not?

A: In this case, the "legacy stations" in some situations will make wrong forwarding decisions. A problem with two different implementations is not seen. The forwarding gets better with a growing number of stations with correct implementation of soft state IS\_NEIGHBOUR.

8.1.2 Minimum data elements of a *Location Table Entry*

A *Location Table Entry* (LocTE) shall contain at least the following data elements:

* GeoNetwork address of the ITS-S *GN\_ADDR*.
* LL address of the ITS-S *LL\_ADDR*.
* Type of the ITS-S (e.g. vehicle ITS-S, roadside ITS-S).
* Version of the GeoNetworking protocol used by the ITS-S.
* Position vector *PV*, i.e. *Long Position Vector* *LPV* (clause 9.5.2), of the ITS-S, comprised of:
	+ Geographical position *POS(GN\_ADDR)*;
	+ Speed *S(GN\_ADDR)*;
	+ Heading *H(GN\_ADDR)*;
	+ Timestamp of the geographical position *TST(POS, GN\_ADDR)*;
	+ Position accuracy indicator *PAI(POS, GN\_ADDR).*
* Flag *LS\_PENDING(GN\_ADDR)*: Flag indicating that a Location Service (LS) (clause 10.2.4) is in progress.
* Flag *IS\_NEIGHBOUR(GN\_ADDR)*:Flag indicating that the GeoAdhoc router is in direct communication range, i.e. is a neighbour.
The flag is soft-state, i.e., falls back to FALSE if not set to TRUE again for a duration of
‘*itsGnNeighbourFlagExpiry*.
* *DPL(GN\_ADDR)*: Duplicate packet list for source GN\_ADDR.
* Timestamp *TST(GN\_ADDR*): The timestamp of the last packet from the source *GN\_ADDR* that was identified as 'not duplicated'.

Annex H (normative):
GeoNetworking protocol constants

The GeoNetworking protocol constants and their default/initial values shall be as specified in table H.1.

The protocol constants represent MIB attributes specified in annex I.

Table H.1: GeoNetworking protocol constants

|  |  |  |  |
| --- | --- | --- | --- |
| **Item** | **GeoNetworking protocol constant** | **Default/initial value** | **Comment** |
| .. | … | … | … |
| 35 | itsGnDefaultTrafficClass | 0x00 | Forwarding: Default traffic class |
| 36 | itsGnNeighbourFlagExpiry | 3,75 | Lifetime of *IS\_NEIGHBOUR* flag [s]Default value of 3,75 s: *itsGnBeaconServiceRetransmitTimer* + *itsGnBeaconServiceMaxJitter* (= 3.75s). |

History

|  |
| --- |
| **Document history** |
| <Version> | <Date> | <Milestone> |
| 0.0.1 | 03-04-19 | First draft |
| 0.0.2 | 20-01-20 | Second draft |
| 0.0.3 | 06-08-20 | Third draft |
| 0.0.4 | 25-01-21 | Fourth draft |
| 0.0.5 | 03-02-22 | Fifth draft |
| 0.0.6 | 28-10-22 | Sixth draft |

*Latest changes made on 2022-10-28*