Triggering Conditions and Data Quality Unresponsive Driver

CAR 2 CAR Communication Consortium

About the C2C-CC

Enhancing road safety and traffic efficiency by means of Cooperative Intelligent Transport Systems and Services (C-ITS) is the dedicated goal of the CAR 2 CAR Communication Consortium (C2C-CC). The industrial driven, non-commercial association was founded in 2002 by vehicle manufacturers affiliated with the idea of cooperative road traffic based on Vehicle-to-Vehicle Communications (V2V) and supported by Vehicle-to-Infrastructure Communications (V2I). The Consortium members represent worldwide major vehicle manufactures, equipment suppliers and research organisations.

Over the years, the C2C-CC has evolved to be one of the key players in preparing the initial deployment of C-ITS in Europe and the subsequent innovation phases. C2C members focus on wireless V2V communication applications based on Direct Communication and concentrate all efforts on creating standards to ensure the interoperability of cooperative systems, spanning all vehicle classes across borders and brands. As a key contributor, the C2C-CC and its members work in close cooperation with the European and international standardisation organisations.

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Document information

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Table 1: Document information

Changes since last release

Release	Date	Changes	Edited by	Approved
2.0.2	2025-12-19	Initial release	Release Management	Steering Committee

Table 2: Changes since last release

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1 Introduction

Other (informational) **RS_tcUrD_1**

This document describes the triggering conditions for unresponsive driver for the following C-ITS services:

- unresponsive driver – risk mitigation function active

2 Definitions

Definition **RS_tcUrD_2**

‘*Vehicle speed*’ is the length of the velocity-vector of the reference position point.

3 Requirement specifications

3.1 Unresponsive driver – risk mitigation function active

3.1.1 Description of vehicle C-ITS service

Other (informational) **RS_tcUrD_3**

This clause describes the triggering of V2X messages for the *unresponsive driver warning - risk mitigation function active* vehicle C-ITS service. In the exceptional situation where the driver fails to respond to requests to take control of the vehicle, a DENM shall be triggered, while the risk mitigation function manoeuvres the vehicle to a safe standstill within its system limits.

Other (informational) **RS_tcUrD_4**

A DENM signal shall be sent to the stack only if the triggering conditions described in this clause are evaluated as valid. Such a signal prompts the stack to generate a new or an update DENM. If the triggering conditions are not fulfilled, a DENM signal shall not be generated.

3.1.2 Triggering conditions

3.1.2.1 Preconditions

Requirement (i) **RS_tcUrD_5**

No specific preconditions apply for this vehicle C-ITS service.
Tested by:

3.1.2.2 Service-specific conditions

Requirement (i) **RS_tcUrD_6**

If the following condition is satisfied, the triggering condition for this vehicle C-ITS service are fulfilled and the generation of a DENM shall be triggered:

A risk mitigation function is active, as defined in [UNECE R79].
Tested by:

3.1.2.3 Information quality

Requirement (i) **RS_tcUrD_7**

The value of the data element *informationQuality* in the DENM depends on how the event is detected. The *informationQuality* value shall be set in accordance with the following table (highest possible value shall be used):

Table 3: Information quality of ‘unresponsive driver – risk mitigation function active’

Event detection	Value of InformationQuality
No TRCO-compliant implementation	0
Condition of RS_tcUrD_6	1

Tested by:

3.1.3 Termination conditions

Requirement (i) **RS_tcUrD_8**

The vehicle C-ITS service shall be terminated when the triggering condition is no longer valid or the vehicle became stationary. At the termination of the vehicle C-ITS service, update DENM request shall be terminated.

Tested by:

3.1.3.1 Cancellation

Requirement (i) **RS_tcUrD_9**

A cancellation DENM shall not be used for this vehicle C-ITS service.
Tested by:

3.1.3.2 Negation

Requirement (i) **RS_tcUrD_10**

A negation DENM shall not be used for this vehicle C-ITS service.
Tested by:

3.1.4 Update

Requirement (i) **RS_tcUrD_10**

The generated DENM shall be updated every 500 ms if the triggering conditions are still satisfied. All data fields that are assigned new values are defined in RS_tcUrD_6.
Tested by:

3.1.5 Repetition duration and repetition interval

Requirement (i) **RS_tcUrD_11**

A repetition of the DENM shall not be used for this vehicle C-ITS service.
Tested by:

3.1.6 Traffic class

Requirement (i) **RS_tcUrD_12**

New and update DENMs shall be set to *traffic class* 0.
Tested by:

3.1.7 Message parameters

3.1.7.1 DENM

Requirement (i) **RS_tcUrD_13**

The following table specifies the data elements of the DENM that shall be set.

Table 4: DENM data elements of 'Unresponsive driver – risk mitigation function active'

Data field	Value
Management container	
actionID	Identifier of a DENM. Shall be set in accordance with [TS 102 894-2].
detectionTime	*TimestampIts*-timestamp at which the event is detected by the originating vehicle C-ITS station. Shall be set in accordance with [TS 102 894-2].
	Shall be refreshed for an update DENM.
referenceTime	*TimestampIts*-Timestamp at which a new DENM or an update DENM is generated. Shall be set in accordance with [TS 102 894-2].
termination	Shall not be set, because neither negation nor cancellation are to be used in this vehicle C-ITS service.
eventPosition	*ReferencePosition*. Shall be set in accordance with [TS 102 894-2].
	Shall be refreshed for every update DENM.
relevanceDistance	lessThan1000m(4)

<table>
<tr><td rowspan="6">relevanceTrafficDirection</td><td colspan="3">If the roadType is known the value shall be set as follows:</td></tr>
<tr><td>RoadType</td><td>Direction</td><td></td></tr>
<tr><td>0</td><td>allTrafficDirections(0)</td><td></td></tr>
<tr><td>1</td><td>upstreamTraffic(1)</td><td></td></tr>
<tr><td>2</td><td>allTrafficDirections(0)</td><td></td></tr>
<tr><td>3</td><td>upstreamTraffic(1)</td><td></td></tr>
<tr><td></td><td colspan="3">Otherwise, the value shall be set to allTrafficDirections(0)</td></tr>
<tr><td>validityDuration</td><td colspan="3">2 s</td></tr>
<tr><td>stationType</td><td colspan="3">The type of the originating vehicle C-ITS station. Shall be set in accordance with [TS 102 894-2].</td></tr>
<tr><td colspan="4">Situation container</td></tr>
<tr><td>informationQuality</td><td colspan="3">See RS_tcUrD_7.</td></tr>
<tr><td>causeCode</td><td colspan="3">dangerousSituation(99)</td></tr>
<tr><td>subCauseCode</td><td colspan="3">riskMitigationFunctionEngaged(8)
Note: The updated version of the ETSI Common Data Dictionary in [TS 102 894-2 V2.4.1] shall be used.</td></tr>
<tr><td>linkedCause</td><td colspan="3">A linkedCause with CauseCode humanProblem (93) and SubCauseCode unresponsiveDriver (3) shall be set.
Note: The updated version of the ETSI Common Data Dictionary in [TS 102 894-2 V2.4.1] shall be used.</td></tr>
<tr><td colspan="4">Location container</td></tr>
<tr><td rowspan="2">eventSpeed</td><td colspan="3">Speed of the originating vehicle C-ITS station. Shall be set in accordance with [TS 102 894-2].</td></tr>
<tr><td colspan="3">Shall be refreshed for an update DENM.</td></tr>
<tr><td rowspan="2">eventPositionHeading</td><td colspan="3">Heading of the originating vehicle C-ITS station. Shall be set in accordance with [TS 102 894-2].</td></tr>
<tr><td colspan="3">Shall be refreshed for an update DENM.</td></tr>
<tr><td rowspan="2">traces</td><td colspan="3">PathHistory of the originating vehicle C-ITS station. Shall be set in accordance with [TS 102 894-2].</td></tr>
<tr><td colspan="3">Shall be refreshed for an update DENM.</td></tr>
<tr><td>roadType</td><td colspan="3">RoadType of the road on which the detecting vehicle C-ITS station is situated.</td></tr>
</table>

<table>
<tr><td></td><td>Shall be refreshed for an update DENM.</td></tr>
<tr><td></td><td>Shall be set in accordance with [TS 102 894-2] in combination with the following rules:
<table>
<tr><th>Urban / non-urban</th><th>Structural separation</th><th>Data element</th></tr>
<tr><td>Urban</td><td>No</td><td>urban-NoStructuralSeparation ToOppositeLanes(0)</td></tr>
<tr><td>Urban</td><td>Yes</td><td>urban-WithStructuralSeparation ToOppositeLanes(1)</td></tr>
<tr><td>Urban</td><td>Unknown</td><td>urban-NoStructuralSeparation ToOppositeLanes(0)</td></tr>
<tr><td>Non-urban</td><td>No</td><td>nonUrban-NoStructuralSeparation ToOppositeLanes(2)</td></tr>
<tr><td>Non-urban</td><td>Yes</td><td>nonUrban-WithStructuralSeparation ToOppositeLanes(3)</td></tr>
<tr><td>Non-urban</td><td>Unknown</td><td>nonUrban-NoStructuralSeparation ToOppositeLanes(2)</td></tr>
</table></td></tr>
<tr><td></td><td>If the information about the urban/non-urban status cannot be determined, the data element shall be omitted.</td></tr>
<tr><td colspan="2">Alacarte container</td></tr>
<tr><td rowspan="3">lanePosition</td><td>If the lanePosition is provided by an on-board sensor (e.g. radar, camera), the value shall be set in accordance with [TS 102 894-2]. Use of GNSS and a digital map to estimate the lane number is not legitimate for this version of the triggering condition.</td></tr>
<tr><td>If the lanePosition is unknown, the data element shall be omitted.</td></tr>
<tr><td>Shall be refreshed for an update DENM.</td></tr>
</table>

Tested by:

3.1.7.2 CAM

Requirement (i) **RS_tcUrD_14**

CAM adaption shall not be used for this vehicle C-ITS service.

Tested by:

3.1.8 Network and transport layer

Requirement (i) **RS_tcUrD_15**

The interface parameter destination area in IF.DEN.1 [ETSI EN 302 637-3] shall be equal to a circular shape with centre point equal to *eventPosition* and radius equal to r*elevanceDistance*.

Tested by:

3.1.9 Security layer

Requirement (i) **RS_tcUrD_16**

When the triggering conditions as described in clause 3.1.2 apply, the application shall request the blocking of the AT changeover as defined in RS_BSP_184.

Tested by:

3.1.10 Transition towards the stationary vehicle Warning

Other (informational) **RS_tcUrD_17**

The risk mitigation function either ends or stops the vehicle. If the driver does not respond to takeover requests, the system stops the vehicle safely within its limits. After stopping, a DENM is triggered according to the conditions outlined in “Triggering Conditions and Data Quality Stationary Vehicle Warning.”