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# Intelligent transport systems (ITS) — Guidance protocol via personal ITS station for advisory safety systems —

## Part 3:
## Road guidance protocol (RGP) conformance test specification

*Systèmes intelligents de transport — Protocole d'orientation par station ITS personnelle pour systèmes à avis de sécurité —*

*Partie 3: Spécification d'essai de conformité du protocole d'orientation routière*

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# Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by ISO/TC 204, *Intelligent transport systems*.

A list of all the parts in the ISO 13184 series, can be found on the ISO website.

# Introduction

This document specifies a real-time decision support system for guidance information, designed to enhance mobility and vehicle safety and to provide a parking guide service using the Personal-ITS-Station (P-ITS-S). The purpose of the system is to transmit guidance or warning messages to drivers and pedestrians in real-time, enhance the user's convenience and avoid congestion in parking facilities by preventing accidents and enabling easy parking.

This document covers subjects related to traffic safety including pedestrians in addition to vehicle drivers. This Data eXchange Message (DXM) implementation describes how the safety-related services are provided using the P-ITS-S.

This system is based on the following assumptions:

— The P-ITS-S has limited resources and the implementation design considers these limitations.

— Use cases related to the safety warning and parking guide service can be classified in various ways. These use cases can be added or deleted frequently depending on the specific circumstances of roads and parking spaces. Therefore, the DXM implementation needs to be designed to be flexible and extendable, which enables the addition or deletion of the use cases conveniently.

— The DXM implementation of road guidance contains data elements to configure the message transmitted between the ITS Stations.

— The major use cases include safety warnings at roads and parking guide services to be used between the Roadside ITS Station (R-ITS-S) and the P-ITS-S.

# Intelligent transport systems (ITS) — Guidance protocol via personal ITS station for advisory safety systems —

## Part 3:
## Road guidance protocol (RGP) conformance test specification

## 1 Scope

This document specifies conformance tests for a self-conformance assessment of the supplier's P-ITS-S system. The conformance test cases follow the use case definition of ISO/TR 13184-1 and the requirements stated in ISO 13184-2 based on the Data eXchange Message (DXM) at the application level regarding the safety warning and parking guide services between

— the Vehicle ITS Station (V-ITS-S) installed in the vehicle, or

— a Personal ITS Station (P-ITS-S), e.g. Nomadic Device, in a vehicle or used by a pedestrian, and

— a Roadside ITS Station (R-ITS-S) installed at the roadside.

The primary but not exclusive purpose of this document is to provide information to the P-ITS-S system provider to build and test the P-ITS-S system against the conformance test cases. This final step in the development process of the P-ITS-S system ensures providers that their P-ITS-S system meets a high degree of functional requirements expected by the end user.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/TR 13184-1, *Intelligent transport systems (ITS) — Guidance protocol via personal ITS station for advisory safety systems — Part 1: General information and use case definitions*

ISO 13184-2, *Intelligent transport systems (ITS) — Guidance protocol via personal ITS station for advisory safety systems — Part 2: Road guidance protocol (RGP) requirements and specification*

ISO/TS 17419, *Intelligent transport systems — Cooperative systems — Classification and management of ITS applications in a global context*

ISO/TS 17423, *Intelligent transport systems — Cooperative systems — ITS application requirements and objectives for selection of communication profiles*

ISO 21217, *Intelligent transport systems — Communications access for land mobiles (CALM) — Architecture*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/TR 13184-1, ISO 13184-2, ISO/TS 17419, ISO/TS 17423 and ISO 21217 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

# 4 Abbreviated terms

DXM          data eXchange message

ITS          intelligent transport systems

OSI          open systems interconnection

P-ITS-S      personal-intelligent transport system-station

R-ITS-S      roadside-intelligent transport system-station

RGP          road guidance protocol

V-ITS-S      vehicle-intelligent transport system-station

# 5 Conventions

This document is based on the conventions discussed in ISO/IEC 10731[1] OSI service conventions, as they apply for communication services. The vehicle data transfer protocol is applicable to OSI layers 5, 6 and 7.

# 6 Conformance test basic principles and clustering

## 6.1 Basic principles for conformance test case definition

Basic principles (BP) have been established as a guideline to define the road guidance protocol via DXM implementation conformance test cases:

— BP1: The primary objective of the conformance test is to support a company which has developed a P-ITS-S in the assessment of self-conformance of the P-ITS-S system. The conformance test is not limited to usage by such company. Some test cases may not be performed by third parties due to the nature of the test cases.

— BP2: The person performing the conformance test is qualified, i.e. test experience, knowledge about Cooperative ITS systems, familiarity and understanding of the relevant ISO 13184 series of standards, and shall have a keen understanding of the business application of the P-ITS-S system.

— BP3: The conformance test should address the RGP implementation.

— BP4: The conformance test tests the proper functioning of the RGP implementation, i.e. correct input data provide correct output data.

— BP5: The person performing the conformance test verifies that the purpose of the use case is achieved following the descriptions of the RGP regarding the implementation of the use case and the steps to enter the input and to obtain the output according to ISO/TR 13184-1.

— BP6: The name of the test case should be the same as the name of the use case (see ISO/TR 13184-1) or requirement (see ISO 13184-2).

— BP7: Each test case should have a preamble (setup state).

— BP8: Classification for each test case is included in order to support the classification criteria specified for use cases and requirements.

— BP9: A test case is only applicable if the use case or requirement is supported by the P-ITS-S.

— BP10: Some test cases may require payment or a valid subscription before processing the next step.

**CAUTION — The person performing the conformance test is responsible for entering valid data and correctly executing necessary actions in order to maintain integrity of the implementation of the RGP implementation between the P-ITS-S and other ITS-Stations.**

## 6.2 Test case structure

### 6.2.1 Conformance test case — General structure

#### 6.2.1.1 Test case reference number and title [RGP-CT_...] [title]

Each test case is structured into six (6) subclauses:

— Overview,

— Test purpose,

— Configuration,

— Preamble (setup state),

— Test execution,

— Postamble.

Details and examples for each of these titles (ordered list) are given below.

A reference to the corresponding test case requirement is specified via a unique abbreviation, number and title as follows:

— [RGP-CT_UCx.y] of ISO/TR 13184-1;

where:

— 'x', 'y' are numeric numbers as assigned in ISO/TR 13184-1.

#### 6.2.1.2 Overview

This is a conformance test for checking the UC x.y followed by the subject description as specified in ISO 13184-2.

#### 6.2.1.3 Test purpose

The test purpose gives a short description of the relevant test cases and a reference to the corresponding requirement specified in ISO/TR 13184-1 and ISO 13184-2.

NOTE    The test case approach depends on the definition of the referenced requirement in ISO/TR 13184-1 and ISO 13184-2.

#### 6.2.1.4 Configuration

The configuration describes the test scenario prerequisites.

#### 6.2.1.5 Preamble (setup state)

The preamble defines preconditions which are used for preparation and initialization of the road guidance protocol with a view to performing the specific test. For example, a precondition could be the successful establishment of a connection between the P-ITS-S and the R-ITS-S.

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#### 6.2.1.6 Test execution

The test execution of a single test case is organized by steps. These steps are described in Table 1 as shown in the example below.

**Table 1 — Test execution example**

| Step # | Description |
|---|---|
| 1 | Description of 1st test step. |
| 2 | Description of 2nd test step. |
| N | Description of Nth test step. |

#### 6.2.1.7 Postamble

The postamble defines post test conditions which are used to return the road guidance protocol implementation back to a definite state.

#### 6.2.2 Test result criteria

The test result criteria are composed of three different results as listed in Table 2.

**Table 2 — Test result criteria**

| Result | Definition |
|---|---|
| Pass | The test purpose was achieved as expected. |
| Deficiency | The test purpose was achieved with opportunities for improvement identified and documented in detail. |
| Fail | The test purpose was not achieved. Reason(s) shall be documented in detail. |

### 6.3 Conformance test clustering

#### 6.3.1 General

Subclause 6.3.2 provides an overview of all conformance test clusters and the associated test cases for mandatory and optional use cases and requirements. Test cases for optional use cases and requirements are only possible if the P-ITS-S has implemented them. Each test case is assigned to one conformance test cluster. The clusters cover technical areas, where the assigned test case(s) applies.

#### 6.3.2 Main conformance test case clusters

Table 3 defines the main conformance test case clusters.

**Table 3 — Main conformance test case clusters**

| # – Main title of cluster | Brief description | Test case reference |
|---|---|---|
| 1 – Check crossroads with a traffic signal RGP implementation | This cluster describes the test cases that check the signal violating vehicle as a risk factor. A vehicle at a crossroads is controlled by the signalling system of the traffic signal. The test cases presented in this section are designed to provide a test for a service for smooth crossroad traffic control while complying with the signalling system and protecting pedestrians on a pedestrian crossing. | [RGP-CT_UC.1.1] – Vehicle violates a signal without stopping, [RGP-CT_UC.1.2] – Violating vehicle is inside the crossroads, [RGP-CT_UC1.4] – Pedestrians violate the traffic signal on a pedestrian crossing, [RGP-CT_UC1.5] – The traffic is bumper to bumper on the crossroads; |
| 2 – Check crossroads RGP implementation | This cluster describes the test case that checks the scenario that the crossroad is not equipped with a traffic signal, which may cause traffic congestion if several vehicles enter into the crossroad simultaneously. | [RGP-CT_UC2.1] – Crossroads without a traffic signal; |
| 3 – Check parking space RGP implementation | This cluster describes the test cases that check the behaviour when a vehicle enters into the parking space. It is difficult for the vehicle driver to check how many parking spots are available. Therefore, if the parking space is full or if a parking spot is available but cannot be identified conveniently, the driver will waste time parking the vehicle or may even be unable to find a parking spot for the vehicle. In addition, the driver may not be able to park the vehicle at a convenient spot. | [RGP-CT_UC3.1] – Parking guide when the vehicle enters a parking area, [RGP-CT_UC3.2] – Searching the path and parking space on demand; |
| 4 – Check risky environment alarm RGP implementation | This cluster describes the test cases that check the behaviour of the oncoming vehicle and speed limit regulation. The test cases focus on reducing and preventing an accident which can be caused by the geometric structure of the road.<br><br>Two test cases consider the speed limit of the vehicles with some special cases that contain school zone and severe weather conditions.<br><br>Two additional test cases consider temporary road occupation scenarios and the situation of an emergency vehicle to establish a clear path. | [RGP-CT_UC4.1] – A vehicle strays into the path of an oncoming vehicle, [RGP-CT_UC4.2] – A vehicle approaches the curved road with excessive speed, [RGP-CT_UC4.3] – Risky environments alarm in severe weather conditions, [RGP-CT_UC4.4] – Risky environments alarm in areas of speed limit enforcement, [RGP-CT_UC4.5] – Vehicle approaches a temporary road occupation, [RGP-CT_UC4.6] – Emergency vehicle approaching. |

# 7 CT cluster 1 — Check crossroads with a traffic signal RGP implementation

## 7.1 [RGP-CT_UC.1.1] — Vehicle violates a signal without stopping

### 7.1.1 Overview

This is a conformance test for checking the UC 1.1 when a vehicle violates a stop signal at the crossroads as specified in ISO 13184-2.

### 7.1.2 Test purpose

The purpose of the conformance test is to verify that after sending a notify-on-position message by the P-ITS-S to the R-ITS-S the P-ITS-S receives a collision-possible message.

### 7.1.3 Configuration

Set up a traffic light simulation for an R-ITS-S at a crossing with streets to north, east, south and west. Set the traffic light "red" for vehicles from west to east and "green" for vehicles from south to north.

### 7.1.4 Preamble (setup state)

Setup conditions: The messages notify-on-position, stop-notify, collision-possible and release have been successfully tested and passed. Two vehicles (V and W) with P-ITS-Ss are in the road guidance zone of an R-ITS-S (R) at the crossing. Vehicle V is on the west street of the crossing driving east. Vehicle W is on the south street of the crossing driving north.

### 7.1.5 Test execution

Table 4 defines the test execution.

**Table 4 — [RGP-CT_UC.1.1] — Vehicle violates a signal without stopping test execution**

| Step # | Description |
|--------|-------------|
| 1 | Simulate V sending a notify-on-position message to R containing the GPS position and a high speed (so that it would be impossible for V to stop at the crossing). |
| 2 | Check if R receives a notify-on-position message from V (check log file). |
| 3 | Simulate W sending a notify-on-position message to R containing a position as close to the crossing as V with the same speed. |
| 4 | Check if R receives a notify-on-position message from W. |
| 5 | Check if V and W receive a collision-possible message from R. |
| 6 | Simulate V sending a notify-on-position message containing a different, unproblematic GPS position and speed. |
| 7 | Check if V and W receive release messages from R. |
| 8 | Simulate W sending a stop-notify message to R. |
| 9 | Check if W does no longer receive messages from R. |

### 7.1.6 Preamble (setup state)

Setup conditions: None.

## 7.2 [RGP-CT_UC.1.2] — Violating vehicle is inside the crossroads

### 7.2.1 Overview

This is a conformance test for checking the UC 1.2 when a violating vehicle is inside the crossroads as specified in ISO 13184-2.

### 7.2.2 Test purpose

The purpose of the conformance test is to verify that after sending a notify-on-position message by the P-ITS-S to the R-ITS-S the P-ITS-S receives a vehicle-blocks-road message.

### 7.2.3 Configuration

No additional configuration is required.

### 7.2.4 Preamble (setup state)

Setup conditions: The messages notify-on-position, stop-notify, vehicle-blocks-road and release have been successfully tested and passed. Two vehicles (V and W) with P-ITS-Ss are in the road guidance zone of an R-ITS-S (R) at a crossing with streets to north, east, south and west. Vehicle A is on the west street of the crossing driving east. Vehicle W is on the south street of the crossing driving north.

### 7.2.5 Test execution

Table 5 defines the test execution.

**Table 5 — [RGP-CT_UC.1.2] — Violating vehicle is inside the crossroads test execution**

| Step # | Description |
|---|---|
| 1 | Simulate V sending a notify-on-position message to R containing the GPS position inside the crossing blocking a lane. |
| 2 | Check if R receives a notify-on-position message from V (check log file). |
| 3 | Simulate W sending a notify-on-position message to R containing a position on the south street. |
| 4 | Check if R receives a notify-on-position message from B. |
| 5 | Check if V and W receive a vehicle-blocks-road message from R. |
| 6 | Simulate V sending a notify-on-position message containing an unproblematic GPS position. |
| 7 | Check if V and W receive release messages from R. |
| 8 | Simulate W sending a stop-notify message to R. |
| 9 | Check if W does no longer receive messages from R. |

### 7.2.6 Postamble

No post test conditions.

## 7.3 [RGP-CT_UC1.4] — Pedestrians violate the traffic signal on a pedestrian crossing

### 7.3.1 Overview

This is a conformance test for checking the UC 1.4 pedestrians violating a traffic signal on a pedestrian crossing as specified in ISO 13184-2.

### 7.3.2 Test purpose

The purpose of the conformance test is to verify that after sending a notify-on-position message by the P-ITS-S of a pedestrian to the R-ITS-S the P-ITS-S of a vehicle receives a pedestrian-blocks-road message.

### 7.3.3 Configuration

Set up a traffic light simulation for an R-ITS-S at a pedestrian crossing with a north-south street and a west-east pedestrian crossing. Set the traffic light "red" for all pedestrians and "green" for all vehicles.

### 7.3.4 Preamble (setup state)

Setup conditions: The messages notify-on-position, stop-notify, pedestrian-blocks-road and release have been successfully tested and passed. One vehicle V with a P-ITS-S is in the road guidance zone of an R-ITS-S (R) of the pedestrian crossing. A pedestrian P with a P-ITS-S is on the pedestrian crossing.

**7.3.5    Test execution**

Table 6 defines the test execution.

**Table 6 — [RGP-CT_UC1.4] — Pedestrians violate the traffic signal on a pedestrian crossing test execution**

| Step # | Description |
|---|---|
| 1 | Simulate V sending a notify-on-position message to R containing the GPS position in the middle of the pedestrian crossing. |
| 2 | Check if R receives a notify-on-position message from V (check log file). |
| 3 | Simulate V sending a notify-on-position message to R containing a position in front of the pedestrian crossing. |
| 4 | Check if R receives a notify-on-position message from V. |
| 5 | Check if P and V receive a collision-possible message from R. |
| 6 | Simulate P sending a notify-on-position message containing a GPS position at the border of the pedestrian crossing. |
| 7 | Check if P and V receive release messages from R. |
| 8 | Simulate V sending a stop-notify message to R. |
| 9 | Check if V does no longer receive messages from R. |

**7.3.6    Postamble**

No post test conditions.

**7.4    [RGP-CT_UC1.5] — Traffic is bumper to bumper on the crossroads**

**7.4.1    Overview**

This is a conformance test for checking the UC 1.5 for bumper to bumper traffic on the crossroads as specified in ISO 13184-2.

**7.4.2    Test purpose**

The purpose of the conformance test is that after sending a notify-on-position message by the P-ITS-S of a vehicle user to the R-ITS-S the P-ITS-S of another vehicle receives a bumper-to-bumper message.

**7.4.3    Configuration**

No additional configuration is required.

**7.4.4    Preamble (setup state)**

Setup conditions: The messages notify-on-position, stop-notify, bumper-to-bumper and release have been successfully tested and passed. Some vehicles (V, W, X) with P-ITS-Ss are in the road guidance zone of an R-ITS-S (R) at a crossing with streets to north, east, south and west. All vehicles are driving from south to north.

**7.4.5    Test execution**

Table 7 defines the test execution.

**Table 7 — [RGP-CT_UC1.5] — Traffic is bumper to bumper on the crossroads test execution**

| Step # | Description |
|--------|-------------|
| 1 | Simulate V sending a notify-on-position message to R containing the GPS position inside the crossing with speed 0. |
| 2 | Check if R receives a notify-on-position message from V (check log file). |
| 3 | Simulate W sending a notify-on-position message to R containing the GPS position inside the crossing with speed 0 behind V. |
| 4 | Check if R receives a notify-on-position message from W. |
| 5 | Simulate X sending a notify-on-position message to R containing the GPS position in front of the crossing with a speed > 0. |
| 6 | Check if R receives a notify-on-position message from X. |
| 7 | Check if V, W and X receive a bumper-to-bumper message from R. |
| 8 | Simulate V sending a notify-on-position message containing another GPS position and speed > 0. |
| 9 | Simulate W sending a notify-on-position message containing another GPS position and speed > 0. |
| 10 | Check if V, W and X receive release messages from R. |

### 7.4.6   Postamble

No post test conditions.

# 8   CT cluster 2 — Check crossroads RGP implementation

## 8.1   [RGP-CT_UC2.1] — Crossroads without a traffic signal

### 8.1.1   Overview

This is a conformance test for checking the UC 2.1 for crossroads without a traffic signal as specified in ISO 13184-2.

### 8.1.2   Test purpose

The purpose of the conformance test is to verify that after sending a notify-on-position message by the P-ITS-S of a vehicle to the R-ITS-S the P-ITS-Ss of all interested vehicles receive crossing-priority messages.

### 8.1.3   Configuration

No additional configuration is required.

### 8.1.4   Preamble (setup state)

Setup conditions: The messages notify-on-position, stop-notify and crossing-priority have been successfully tested and passed. Only two vehicles (V and W) with P-ITS-Ss are in the road guidance zone of an R-ITS-S (R) at a crossing without traffic lights with streets to north, east, south and west. Vehicle V is driving from west to east, vehicle W is driving from south to north.

### 8.1.5   Test execution

Table 8 defines the test execution.

**Table 8 — [RGP-CT_UC2.1] — Crossroads without a traffic signal test execution**

| Step # | Description |
|--------|-------------|
| 1 | Simulate V sending a notify-on-position message to R containing the GPS position with a distance of 200 m to the crossing. |
| 2 | Check if R receives a notify-on-position message from V (check log file). |
| 3 | Simulate W sending a notify-on-position message to R containing a GPS position with a distance of more than 200 m. |
| 4 | Check if R receives a notify-on-position message from W. |
| 5 | Check if V receives a crossing-priority message from R with priority 1. |
| 6 | Check if W receives a crossing-priority message from R with priority 2. |
| 7 | Simulate V sending a notify-on-position message containing a GPS position outside the crossing driving to the east. |
| 8 | Check if W receives a crossing-priority message from R with priority 1. |

### 8.1.6 Postamble

No post test conditions.

# 9 CT cluster 3 — Check parking space RGP implementation

## 9.1 [RGP-CT_UC3.1] — Parking guide when the vehicle enters a parking area

### 9.1.1 Overview

This is a conformance test for checking the UC 3.1 for parking guide when the vehicle enters a parking area as specified in ISO 13184-2.

### 9.1.2 Test purpose

The purpose of the conformance test is to verify that after sending a search-parking-space message by the P-ITS-S of a vehicle to the R-ITS-S it receives a guide-parking-space message.

### 9.1.3 Configuration

No additional configuration is required.

### 9.1.4 Preamble (setup state)

Setup conditions: The messages search-parking-space and guide-parking-space have been successfully tested and passed. A vehicle V is searching a parking space in the guidance zone of the R-ITS-S R.

### 9.1.5 Test execution

Table 9 defines the test execution.

**Table 9 — [RGP-CT_UC3.1] — Parking guide when the vehicle enters a parking area test execution**

| Step # | Description |
|--------|-------------|
| 1 | Simulate V sending a search-parking-space message to R containing the GPS position. |
| 2 | Check if R receives a search-parking-space message from V (check log file). |
| 4 | Check if V receives a guide-parking-space message from R including waypoints and navigation hints. |

**Table 9** *(continued)*

| Step # | Description |
|--------|-------------|
| 5 | Simulate V sending a search-parking-space message to R containing another GPS position on the routed way. |
| 5 | Check if R receives a search-parking-space message from V (check log file). |
| 6 | Check if V receives a guide-parking-space message from R including the remaining waypoints and navigation hints. |

### 9.1.6 Postamble

No post test conditions.

## 9.2 [RGP-CT_UC3.2] — Searching the path and parking space on demand

### 9.2.1 Overview

This is a conformance test for use case 3.2 for searching the path and parking space on demand as specified in ISO/TR 13184-1.

### 9.2.2 Test purpose

The purpose of the conformance test is to verify that after sending a search-parking-space message by the P-ITS-S of a vehicle to the R-ITS-S it receives a guide-parking-space message.

### 9.2.3 Configuration

No additional configuration is required.

### 9.2.4 Preamble (setup state)

Setup conditions: The messages search-parking-space and guide-parking-space have been successfully tested and passed. A vehicle V is searching a parking space in the guidance zone of the R-ITS-S R.

### 9.2.5 Test execution

Table 10 defines the test execution for scenario A: Tester's role is an IO legal representative.

**Table 10 — [RGP-CT_UC3.2] — Searching the path and parking space on demand test execution**

| Step # | Description |
|--------|-------------|
| 1 | Simulate V sending a search-parking-space message to R containing the GPS position. |
| 2 | Check if R receives a search-parking-space message from V (check log file). |
| 4 | Check if V receives a guide-parking-space message from R including waypoints and navigation hints. |
| 5 | Simulate V sending a search-parking-space message to R containing another GPS position on the routed way. |
| 5 | Check if R receives a search-parking-space message from V (check log file). |
| 6 | Check if V receives a guide-parking-space message from R including the remaining waypoints and navigation hints. |

# 10 CT cluster 4 — Check risky environment alarm RGP implementation

## 10.1 [RGP-CT_UC4.1] — Vehicle strays into the path of an oncoming vehicle

### 10.1.1 Overview

This is a conformance test for UC 4.1 when a vehicle strays into the path of an oncoming vehicle as specified in ISO/TR 13184-1.

### 10.1.2 Test purpose

The purpose of the conformance test is to verify that after sending a notify-on-position message by the P-ITS-S to the R-ITS-S the P-ITS-S receives an oncoming-vehicle message.

### 10.1.3 Configuration

No additional configuration is required.

### 10.1.4 Preamble (setup state)

Setup conditions: The messages notify-on-position, stop-notify, oncoming-vehicle and release have been successfully tested and passed. Two vehicles (V and W) with P-ITS-Ss are in the road guidance zone of an R-ITS-S (R) at a curved road. The vehicles are coming from opposite directions.

### 10.1.5 Test execution

Table 11 defines the test execution.

Table 11 — [RGP-CT_UC4.1] — Vehicle strays into the path of an oncoming vehicle test execution

| Step # | Description |
|---|---|
| 1 | Simulate V sending a notify-on-position message to R containing the GPS position in the middle of the street (not on its correct lane). |
| 2 | Check if R receives a notify-on-position message from V (check log file). |
| 3 | Simulate W sending a notify-on-position message to R containing a position from the opposite direction on its correct lane. |
| 4 | Check if R receives a notify-on-position message from W. |
| 5 | Check if W receives a upcoming-vehicle message from R. |
| 6 | Simulate V sending a notify-on-position message to R containing a GPS position on its correct lane. |
| 7 | Check if W receives a release message from R. |
| 8 | Simulate W sending a stop-notify message to R. |
| 9 | Check if W does no longer receive messages from R. |

### 10.1.6 Postamble

No post test conditions.

## 10.2 [RGP-CT_UC4.2] — Vehicle approaches the curved road with excessive speed

### 10.2.1 Overview

This is a conformance test for UC 4.2 when a vehicle approaches the curved road with excessive speed as specified in ISO/TR 13184-1.