



TECHNICAL SPECIFICATION

**Intelligent Transport Systems (ITS);  
Testing;  
Conformance test specifications for GeoNetworking  
Basic Transport Protocol (BTP);  
Part 2: Test Suite Structure and Test Purposes (TSS&TP)**

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Reference

RTS/ITS-00367

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Keywords

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# Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Intelligent Transport Systems (ITS).

The present document is part 2 of a multi-part deliverable covering Conformance test specification for Geonetworking Basic Transport Protocol (BTP) as identified below:

- Part 1: "Test requirements and Protocol Implementation Conformance Statement (PICS) pro forma";
- Part 2: "Test Suite Structure and Test Purposes (TSS&TP)";**
- Part 3: "Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT)".

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# 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](#) (Verbal forms for the expression of provisions).

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

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# 1 Scope

The present document provides the Test Suite Structure and Test Purposes (TSS&TP) for Geonetworking Basic Transport Protocol (BTP) as defined in ETSI EN 302 636-5-1 [1] in compliance with the relevant requirements and in accordance with the relevant guidance given in ISO/IEC 9646-7 [i.5].

The ISO standard for the methodology of conformance testing (ISO/IEC 9646-1 [i.2] and ISO/IEC 9646-2 [i.3]) as well as the ETSI rules for conformance testing (ETSI ETS 300 406 [i.6]) are used as a basis for the test methodology.

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## 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.

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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] ETSI EN 302 636-5-1 (V2.2.1): "Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 5: Transport Protocols; Sub-part 1: Basic Transport Protocol".

### 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 EG 202 798: "Intelligent Transport Systems (ITS); Testing; Framework for conformance and interoperability testing".
- [i.2] ISO/IEC 9646-1 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".
- [i.3] ISO/IEC 9646-2 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract Test Suite specification".
- [i.4] ISO/IEC 9646-6 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 6: Protocol profile test specification".
- [i.5] ISO/IEC 9646-7 (1995): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".
- [i.6] ETSI ETS 300 406 (1995): "Methods for testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

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## 3 Definition of terms, symbols and abbreviations

### 3.1 Terms

For the purposes of the present document, the terms given in ETSI EN 302 636-5-1 [1], ISO/IEC 9646-6 [i.4] and ISO/IEC 9646-7 [i.5] apply.

### 3.2 Symbols

Void.

### 3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

|     |                                    |
|-----|------------------------------------|
| BI  | Invalid Behaviour                  |
| BTP | Basic Transport Protocol           |
| BV  | Valid Behaviour                    |
| ITS | Intelligent Transportation Systems |
| IUT | Implementation Under Test          |
| TP  | Test Purposes                      |
| TSS | Test Suite Structure               |

---

## 4 Test Suite Structure (TSS)

### 4.1 Structure for BTP tests

Table 1 shows the BTP Test Suite Structure (TSS) including its subgroups defined for conformance testing.

**Table 1**

| <b>Root</b> | <b>Group</b>            | <b>Category</b> |
|-------------|-------------------------|-----------------|
| BTP         | Packet Generation BTP-A | Valid behaviour |
|             | Packet Generation BTP-B | Valid behaviour |
|             | Packet Processing       | Valid behaviour |

### 4.2 Test groups

#### 4.2.1 Introduction

The test suite has a total of three levels. The first level is the root. The second level separates the root into various functional areas. The third level is the standard ISO conformance test categories.

#### 4.2.2 Root

The root identifies the Geonetworking Basic Transport Protocol (BTP) given in ETSI EN 302 636-5-1 [1].

#### 4.2.3 Groups

This level contains three functional areas identified as: Packet Generation BTP-A, Packet Generation BTP-B and Packet processing.

## 4.2.4 Categories

This level contains the standard ISO conformance test categories limited to the valid behaviour and the invalid behaviour.

# 5 Test Purposes (TP)

## 5.1 Introduction

### 5.1.1 TP definition conventions

The TPs are defined by the rules shown in table 2.

**Table 2: TP definition rules**

| TP Header                   |   |
|-----------------------------|---|
| TP ID                       | The TP ID is a unique identifier. It shall be specified according to the TP naming conventions defined in clause 5.1.2.   |
| Test objective              | Short description of test purpose objective according to the requirements from the base standard.   |
| Reference                   | The reference indicates the sub-clauses of the reference standard specifications in which the conformance requirement is expressed.   |
| PICS Selection              | Reference to the PICS statement involved for selection of the TP. Contains a Boolean expression.  |
| TP Behaviour                |   |
| Initial conditions          | The initial conditions defines in which initial state the IUT has to be to apply the actual TP. In the corresponding Test Case, when the execution of the initial condition does not succeed, it leads to the assignment of an Inconclusive verdict.  |
| Expected behaviour(TP body) | Definition of the events, which are parts of the TP objective, and the IUT are expected to perform in order to conform to the base specification. In the corresponding Test Case, Pass or Fail verdicts can be assigned there.  |
| Final conditions            | Definition of the events that the IUT is expected to perform or shall not perform, according to the base standard and following the correct execution of the actions in the expected behaviour above. In the corresponding Test Case, the execution of the final conditions is evaluated for the assignment of the final verdict. |

### 5.1.2 TP Identifier naming conventions

The identifier of the TP is built according to table 3.

**Table 3: TP naming convention**

| Identifier: | TP/<root>/<gr>/<x>/<nn>  |     |                                  |
|-------------|--------------------------|-----|----------------------------------|
|             | <root> = root            | BTP | Basic Transport Protocol         |
|             | <gr> = group             | PGA | Packet Generation BTP-A          |
|             |                          | PGB | Packet Generation BTP-B          |
|             |                          | PP  | Packet Processing                |
|             | <x> = type of testing    | BV  | Valid Behavior tests             |
|             |                          | BI  | Invalid Syntax or Behavior Tests |
|             | <nn> = sequential number |     | 01 to 99                         |

### 5.1.3 Rules for the behaviour description

The description of the TP is built according to ETSI EG 202 798 [i.1].

## 5.1.4 Sources of TP definitions

All TPs shall be as specified according to ETSI EN 302 636-5-1 [1].

## 5.2 Test purposes for BTP

### 5.2.1 Packet Generation

#### 5.2.1.1 BTP-A

|   |  |
|---|--|
| <b>TP Id</b>  | TP/BTP/PGA/BV/01                                       |
| <b>Test objective</b>   | Checks that BTP-A packet is well-formatted             |
| <b>Reference</b>  | ETSI EN 302 636-5-1 [1], clauses 6, 7.1, 7.2.1 and 8.2 |
| <b>PICS Selection</b>   |  |
| <b>Initial conditions</b>   |  |
| with {<br>the IUT being in the "initial state"<br>}   |  |
| <b>Expected behaviour</b>   |  |
| ensure that {<br>when {<br>the IUT is requested to send a BTP packet via a BTP-data request<br>containing BTP Type<br>indicating value 'BTP-A'<br>containing Source Port<br>indicating value 'SOURCE_PORT'<br>containing Destination Port<br>indicating value 'DESTINATION_PORT'<br>}<br>then {<br>the IUT sends a valid BTP-A packet<br>containing source port<br>indicating 'SOURCE_PORT',<br>containing destination port<br>indicating 'DESTINATION_PORT',<br>containing the Upper Layer payload<br>}<br>} |  |



## 5.2.1.2 BTP-B

|   |   |
|---|---|
| <b>TP Id</b>  | TP/BTP/PGB/BV/01  |
| <b>Test objective</b>   | Checks that BTP-B packet is well-formatted if Destination Port info is provided |
| <b>Reference</b>  | ETSI EN 302 636-5-1 [1], clauses 6, 7.1, 7.3.2 and 8.2                          |
| <b>PICS Selection</b>   |   |
| <b>Initial conditions</b>   |   |
| with {<br>the IUT being in the "initial state"<br>}   |   |
| <b>Expected behaviour</b>   |   |
| ensure that {<br>when {<br>the IUT is requested to send a BTP packet via a BTP-data request<br>containing BTP Type<br>indicating value 'BTP-B'<br>containing Destination Port<br>indicating value 'DESTINATION_PORT'<br>containing Destination Port Info<br>indicating value 'DESTINATION_PORT_INFO'<br>}<br>then {<br>the IUT sends a valid BTP-B packet<br>containing Destination port<br>indicating 'DESTINATION_PORT',<br>containing destination port info<br>indicating 'DESTINATION_PORT_INFO',<br>containing the Upper Layer payload<br>}<br>} |   |

|  |  |
|--|--|
| <b>TP Id</b>   | TP/BTP/PGB/BV/02   |
| <b>Test objective</b>  | Checks that BTP-B packet is well-formatted if no Destination Port Info is provided |
| <b>Reference</b>   | ETSI EN 302 636-5-1 [1], clauses 6, 7.1, 7.3.2 and 8.2                             |
| <b>PICS Selection</b>  |  |
| <b>Initial conditions</b>  |  |
| with {<br>the IUT being in the "initial state"<br>}  |  |
| <b>Expected behaviour</b>  |  |
| ensure that {<br>when {<br>the IUT is requested to send a BTP packet via a BTP-data request via a BTP-data request<br>containing BTP Type<br>indicating value 'BTP-B'<br>containing Destination Port<br>indicating value 'DESTINATION_PORT'<br>not containing Destination Port Info parameter<br>}<br>then {<br>the IUT sends a valid BTP-B packet<br>containing destination port<br>indicating 'DESTINATION_PORT',<br>containing destination port info<br>indicating '0',<br>containing the Upper Layer payload<br>}<br>} |  |

## 5.2.3 Packet processing

### 5.2.3.1 Valid

|  |  |
|--|--|
| <b>TP Id</b>   | TP/BTP/PP/BV/01  |
| <b>Test objective</b>  | Checks that BTP passes a valid BTP-A packet to the upper protocol entity |
| <b>Reference</b>   | ETSI EN 302 636-5-1 [1], clauses 6, 7.1, 7.2.1 and 8.3                   |
| <b>PICS Selection</b>  |  |
| <b>Initial conditions</b>  |  |
| with {<br>the IUT being in the "initial state"<br>}  |  |
| <b>Expected behaviour</b>  |  |
| ensure that {<br>when {<br>the IUT receives a valid BTP-A packet<br>containing source port<br>indicating 'SOURCE_PORT',<br>containing destination port<br>indicating 'DESTINATION_PORT',<br>containing payload<br>}<br>then {<br>the IUT passes the payload to the upper layer<br>}<br>} |  |

|  |  |
|--|--|
| <b>TP Id</b>   | TP/BTP/PP/BV/02  |
| <b>Test objective</b>  | Checks that BTP passes a valid BTP-B packet to the upper protocol entity |
| <b>Reference</b>   | ETSI EN 302 636-5-1 [1], clauses 6, 7.1, 7.3.1 and 8.3                   |
| <b>PICS Selection</b>  |  |
| <b>Initial conditions</b>  |  |
| with {<br>the IUT being in the "initial state"<br>}  |  |
| <b>Expected behaviour</b>  |  |
| ensure that {<br>when {<br>the IUT receives a valid BTP-B packet<br>containing destination port<br>indicating 'DESTINATION_PORT',<br>containing destination port info<br>indicating 'DESTINATION_PORT_INFO'<br>containing payload<br>}<br>then {<br>the IUT passes the payload to the upper protocol<br>}<br>} |  |

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## Annex A (informative): Bibliography

ETSI TS 102 870-1 (V1.2.1): "Intelligent Transport Systems (ITS); Testing; Conformance test specifications for Geonetworking Basic Transport Protocol (BTP); Part 1: Test requirements and Protocol Implementation Conformance Statement (PICS) pro forma".

"GeoNet STREP N 216269 - D2.2 Final GeoNet Specification".

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## History

| <b>Document history</b> |            |             |
|-------------------------|------------|-------------|
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