Abstract

This document defines test structures and procedures for the interoperability testing of Bluetooth products implementing profiles based on the Generic PIM Profile.
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1 Scope

This Bluetooth® document contains the Test Suite Structure (TSS) and Test Cases (TC) for the Bluetooth Generic PIM Profile.

The objective of this test specification is to provide a basis for interoperability tests for Bluetooth devices giving a high probability of air interface interoperability between different manufacturers’ Bluetooth devices.

The Generic PIM Profile (GPP) delivers basic recurring functions to PIM profiles like CTN and will not be implemented as a standalone version. Tests specified in this document may be referenced by profiles based on GPP.
2 References, Definitions, and Abbreviations

2.1 References
This Bluetooth document incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter.

[1] Bluetooth Core Specification 2.1 or later


[3] Bluetooth Generic PIM Profile 1.0 or later


2.2 Definitions and Abbreviations
All definitions and additional abbreviations are found in [1], [2], and [3].

<table>
<thead>
<tr>
<th>Abbreviation or Acronym</th>
<th>Meaning</th>
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<td>PAS</td>
<td>PIM Access Service</td>
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<tr>
<td>PIM</td>
<td>Personal Information Management</td>
</tr>
<tr>
<td>PIMCE</td>
<td>PIM Client Equipment</td>
</tr>
<tr>
<td>PIMSE</td>
<td>PIM Server Equipment</td>
</tr>
<tr>
<td>PNS</td>
<td>PIM Notification Service</td>
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3 Test Suite Structure (TSS)

3.1 Test Strategy

GPP is not intended to be qualified as such. The tests for PIM application profiles based on GPP should be performed as Interoperability Tests.

The Generic PIM Profile test cases defined in this document may be referenced by application profiles based on GPP.

Figure 3.1: GPP Interoperability Test Structure Representation (1)
3.2 Test Groups

This section defines test groups to structure the GPP tests.

Figure 3.1 and Figure 3.2 summarize the TSS for the interoperability tests based on GPP.

GPP session management
Tests related to the OBEX session management functionality.

3.2.1 GPP instance handling
Tests verifying the instance-related functions of GPP, i.e. getting instance information and updating instances. These functions are part of PIM Access Service.
3.2.2 GPP Notification Registration
Tests verifying the control of the notification. This function is part of the PIM Access Service.

3.2.3 Notification
Tests verifying the notification i.e. functionality for sending events from the PIMSE to the PIMCE. This function is part of the PIM Notification Service.

3.2.4 Browsing
Tests verifying that the PIMCE can browse through the PIMSE’s object repository. This function is part of the PIM Access Service.

3.2.5 Object handling
Tests verifying the handling of literal objects, i.e. download, upload and deletion of literal objects in the PIMSE’s repository by the PIMCE. These functions are part of the PIM Access Service.

3.2.6 GPP account handling
Tests verifying the account-related functions of GPP, i.e. getting account information and updating accounts. These functions are part of PIM Access Service.
4 Test Cases

4.1 Introduction

4.1.1 Test Case Identification Convention

Test cases shall be assigned unique identifiers per the conventions in [2]. The convention used here is <spec abbreviation>/<IUT role>/<feat>/<xx>-<nn>-<y>.

Test group abbreviations for class, feature, function, sub-function or capability (as applicable to this test specification) are defined in Table 4.1

<table>
<thead>
<tr>
<th>Identifier Abbreviation</th>
<th>Feature Identifier &lt;feat&gt;</th>
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<tr>
<td>GPP</td>
<td>Generic PIM Profile</td>
</tr>
<tr>
<td>GSM</td>
<td>GPP Session Management functions</td>
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<tr>
<td>GIH</td>
<td>GPP Instance Handling functions</td>
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<tr>
<td>GNR</td>
<td>GPP Notification Registration functions</td>
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<tr>
<td>GNO</td>
<td>GPP Notification functions</td>
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<td>GBR</td>
<td>GPP Browsing functions</td>
</tr>
<tr>
<td>GOH</td>
<td>GPP Object Handling functions</td>
</tr>
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</table>

*Table 4.1: GPP TC Feature Naming Convention*

4.1.2 Conformance

When conformance is claimed, all capabilities indicated as mandatory for this Specification shall be supported in the specified manner (process-mandatory). This also applies for all optional and conditional capabilities for which support is indicated. All mandatory capabilities, and optional and conditional capabilities for which support is indicated, are subject to verification as part of the Bluetooth Qualification Program.

The Bluetooth Qualification Program may employ tests to verify implementation robustness. The level of implementation robustness that is verified varies from one Specification to another and may be revised for cause based on interoperability issues found in the market.

Such tests may verify:

- That claimed capabilities may be used in any order and any number of repetitions that is not excluded by the Specification, OR
- That capabilities enabled by the implementations are sustained over durations expected by the use case, OR
- That the implementation gracefully handles any quantity of data expected by the use case, OR
• That in cases where more than one valid interpretation of the Specification exist, the implementation complies with at least one interpretation and gracefully handles other interpretations OR

• That the implementation is immune to attempted security exploits.

A single execution of each of the required tests is required in order to constitute a pass verdict. However, it is noted that in order to provide a foundation for interoperability, it is necessary that a qualified implementation consistently and repeatedly pass any of the applicable tests.

In any case, where a member finds an issue with the Test Plan Generator, the Test Case as described in the Test Specification, or with the Test System utilized, the Member is required to notify the responsible party via an errata request such that the issue may be addressed.

4.1.3 General Requirements and Annotations

The Generic PIM Profile delivers basic, recurring functions to PIM profiles and will not be implemented as a standalone profile. Therefore, the test cases in this document can be conducted only in combination with a GPP based application profile that instantiates the functions and requirements defined by GPP.

In particular the following conventions apply:

• Tests defining the establishment or termination of GPP OBEX services (PIM Access/Notification Service) require a corresponding test of the related services of the application profile

• While the description of the data objects hereunder is abstract (PIM objects) it is strongly recommended to perform testing for any PIM application object that is supported by the application profile based on GPP.

4.1.4 Pass/Fail Verdict Conventions

Each test case has an Expected Outcome section, which outlines all the detailed pass criteria conditions that shall be met by the IUT to merit a Pass Verdict.

The convention in this test specification is that, unless there is a specific set of fail conditions outlined in the test case, then the IUT fails the test case as soon one of the pass criteria conditions cannot be met and in case this occurs the outcome of the test shall be the Fail Verdict.

4.2 Session Management

The purpose of the tests described in this section is to verify that OBEX sessions of profiles based on GPP can be established and terminated properly.

Note that GPP is based on OBEX over L2CAP (GOEP 2.0 or later). So, if conformance is claimed concerning OBEX connections OBEX over L2CAP is meant hereunder. Future versions
of existing applications that support also OBEX over RFCOMM for the operation with legacy devices may also re-use the templates below but have to adapt the requirements accordingly.

4.2.1  IUT – PIM Client Equipment (PIMCE)

The purpose of the tests described in this section is to check that the PIM Client Equipment can properly establish and terminate GPP-based sessions.

4.2.1.1  GPP/GSM/BV-01-I [PIMCE Opens a GPP Session with PIM Access Service Only]

- **Test Purpose**
  
  Verify that the PIMCE device can start an OBEX session that involves only the GPP PIM Access Service.

- **Reference**
  
  [3] Section 4.2.1

- **Initial Condition**
  
  - IUT: The IUT and the Lower Tester have been paired and have implemented an application profile based on GPP.
  
  - Lower Tester: The Lower Tester is in discoverable and connectable mode.

- **Test Procedure**
  
  The IUT establishes an OBEX session with the Lower Tester by sending an OBEX CONNECT to the Lower Tester according to the connection parameters defined by the Lower Tester's application profile SDP record that instantiates the GPP PAS SDP record template.

- **Expected Outcome**
  
  Pass verdict

  The OBEX CONNECT response message related to the application profile based on the GPP PAS has been exchanged properly so the service is established. Additional fields may be present in the requests and responses.

4.2.1.2  GPP/GSM/BV-02-I [PIMCE opens a GPP session with PIM Access Service and PIM Notification Service]

- **Test Purpose**
  
  Verify that the PIMCE can start a GPP-based session that involves both the PIM Access Service and PIM Notification Service.

- **Reference**
  
  [3] Section 4.2.2
• Initial Condition
  - IUT: The IUT and the Lower Tester have been paired and have implemented an application profile based on GPP. Both IUT and Lower Tester support a notification feature based on the requirements of the PIM Notification Service.
  - Lower Tester: The Lower Tester is in discoverable and connectable mode.

• Test Procedure
  1. The IUT establishes a GPP session with the Lower Tester by connecting to the OBEX PIM Access Service of the Lower Tester.
  2. The IUT sends the notification status ‘on’ to the Lower Tester using the function ‘SetNotificationRegistration’.
  3. The Lower Tester connects to the OBEX PIM Notification Service of the IUT.

• Expected Outcome
  Pass verdict
  - The OBEX response messages of both the PAS and PNS have been exchanged properly AND
  - Both the PIM Access Service and the PIM Notification Service are established.
  Additional fields may be present in the requests and responses.

4.2.1.3 GPP/GSM/BV-03-I [PIMCE Closes a GPP Session when Only the PIM Access Service is Active]
• Test Purpose
  Verify that the PIMCE can terminate a GPP session.

• Reference
  [3] Section 4.2.3

• Initial Condition
  The IUT is engaged in a GPP session with the Lower Tester. Only the PIM Access Service is in use.

• Test Procedure
  The IUT disconnects the PAS session by sending an OBEX DISCONNECT.

• Expected Outcome
  Pass verdict
  – The OBEX session for PIM Access Service is closed AND
1.0.1.1 – The OBEX DISCONNECT response message of the PAS has been exchanged properly. Additional fields may be present in the requests and responses.

4.2.1.4 GPP/GSM/BV-04-I [PIMCE Closes a GPP Session when both the PIM Access Service and the PIM Notification Service are Active]

• Test Purpose

Verify that the PIMCE can terminate a GPP session.

• Reference

[3] Section 4.2.3

• Initial Condition

The IUT is engaged in a GPP session with the Lower Tester. Both the PIM Access Service and PIM Notification Service are in use.

• Test Procedure

1. The IUT finishes the PNS session by switching the Notification ‘off’ (function SetNotificationRegistration).
2. The Lower Tester disconnects the PNS session by sending an OBEX DISCONNECT.
3. The IUT disconnects the PAS session by sending an OBEX DISCONNECT.

• Expected Outcome

Pass verdict
- Both the PIM Access Service session and the PIM Notification Service sessions are closed AND
- The OBEX DISCONNECT response messages of both the PAS and PNS have been exchanged properly.

Additional fields may be present in the requests and responses.

4.2.1.5 GPP/GSM/BV-05-I [PIMCE Opens a GPP session with Multiple PIM Access Service Instances and PIM Notification Service]

• Test Purpose

Verify that the PIMCE can start a GPP-based session that involves two PIM Access Service instances and a PIM Notification Service.

• Reference

[3] Section 4.2.2

• Initial Condition
- IUT: The IUT and the Lower Tester have been paired and have implemented an application profile based on GPP. Both IUT and Lower Tester support a notification feature based on the requirements of the PIM Notification Service.
- Lower Tester: The Lower Tester is in discoverable and connectable mode.
- Both the Lower Tester and the IUT support multiple PAS instances simultaneously.

**Test Procedure**

1. The IUT establishes a GPP session with the Lower Tester by connecting to two OBEX PIM Access Service instances of the Lower Tester.
2. The IUT sends the notification status ‘on’ to both PAS instances of the Lower Tester using the function ‘SetNotificationRegistration’.
3. The Lower Tester connects to the OBEX PIM Notification Service of the IUT.

**Expected Outcome**

**Pass verdict**
- The OBEX response messages of both the multiple PAS instances and PNS have been exchanged properly AND
- The two PIM Access Service instances and the PIM Notification Service are established.

Additional fields may be present in the requests and responses.

---

### 4.2.1.6 GPP/GSM/BV-06-I [PIMCE Closes a GPP session with multiple active PIM Access Service instances and an activated PIM Notification Service including deregistration of the Notification Service]

**Test Purpose**

Verify that the PIMCE can terminate a GPP session that involves two PIM Access Service instances and a PIM Notification Service, including the deregistration of the PIM Notification Service.

**Reference**

[3] Section 4.2.3

**Initial Condition**

The IUT is engaged in a GPP session with the Lower Tester. Two PIM Access Service instance connections and the PIM Notification Service are in use.

**Test Procedure**

1. The IUT finishes the PNS session by switching the Notification ‘off’ (function SetNotificationRegistration) for both PAS instances.
2. The Lower Tester disconnects the PNS session by sending an OBEX DISCONNECT.
3. The IUT disconnects the two PAS sessions by sending an OBEX DISCONNECT.

- Expected Outcome

Pass verdict
- Both the two PIM Access Service sessions and the PIM Notification Service session are closed AND
- The OBEX DISCONNECT response messages of both the multiple PAS instances and the PNS have been exchanged properly.

Additional fields may be present in the requests and responses.

4.2.1.7 GPP/GSM/BV-07-I [PIMCE Closes a GPP session with multiple active PIM Access Service connections and an activated PIM Notification Service without deregistration of the Notification Service]

- Test Purpose

Verify that the PIMCE can terminate a GPP session that involves two PIM Access Service instances and a PIM Notification Service, without deregistration of the PIM Notification Service.

- Reference

[3] Section 4.2.3

- Initial Condition

The IUT is engaged in a GPP session with the Lower Tester. Two PIM Access Service instance connections and the PIM Notification Service are in use.

- Test Procedure

1. The IUT disconnects the two PAS connections by sending an OBEX DISCONNECT.
2. The Lower Tester disconnects the PNS session by sending an OBEX DISCONNECT.

- Expected Outcome

Pass verdict
- Both the PIM Access Service sessions and the PIM Notification Service session are closed AND
- The OBEX response messages of both the multiple PAS instances and PNS have been exchanged properly.

Additional fields may be present in the requests and responses.
4.2.2 IUT – PIM Server Equipment (PIMSE)

The purpose of the tests described in this section is to check that the PIM Server Equipment device can properly respond to a GPP-based session establishment and termination requests of the PIM Client Equipment (PIMCE) device.

- **GP/GSM/BV-11-I [PIMSE Responds to an open GPP session request for the PIM Access Service] Test Purpose**

  Verify that the PIMSE can properly respond to a GPP-based request for an OBEX session establishment.

- **Reference**

  [3] Section 4.2.1

- **Initial Condition**

  - Lower Tester: The IUT and the Lower Tester have been paired and have implemented an application profile based on GPP.
  - IUT: The IUT is in discoverable and connectable mode.

- **Test Procedure**

  The Lower Tester connects to the IUT by sending an OBEX CONNECT request to the PIM Access Service of the IUT.

- **Expected Outcome**

  Pass verdict

  The IUT responds with a well formed OBEX CONNECT response.

  Additional fields may be present in the requests and responses.

- **GP/GSM/BV-12-I [PIMSE Responds to an open GPP session request with PIM Access Service and PIM Notification Service] Test Purpose**

  Verify that the PIMSE can properly respond to a GPP-based session establishment request.

- **Reference**

  [3] Section 4.2.2

- **Initial Condition**

  - Lower Tester: The IUT and the Lower Tester have been paired and have implemented an application profile based on GPP. Both IUT and Lower Tester support a notification feature based on the requirements of the PIM Notification Service.
  - IUT: the IUT is in discoverable and connectable mode.
• Test Procedure

1. The Lower Tester connects to the IUT by sending an OBEX CONNECT request to the PIM Access Service of the IUT.

2. The Lower Tester sends the notification status ‘on’ to the IUT using the function ‘SetNotificationRegistration’.

3. The IUT connects to the Lower Tester by sending an OBEX CONNECT request to the PIM Notification Service of the Lower Tester.

• Expected Outcome

Pass verdict
The IUT responds to the PIM Access Service connection request with a well formed OBEX CONNECT response and subsequently connects to the PIM Notification Service of the Lower Tester.

Additional fields may be present in the requests and responses.

4.2.2.1 GPP/GSM/BV-13-I [PIMSE Closes a GPP session when only the PIM Access Service is active]

• Test Purpose

Verify that the PIMSE can close a GPP session.

• Reference

[3] Section 4.2.3

• Initial Condition

A GPP session with an active PAS session is ongoing between the IUT and the Lower Tester.

• Test Procedure

1. The Lower Tester disconnects the GPP PAS session by sending an OBEX DISCONNECT.

2. The IUT receives an OBEX DISCONNECT request and finishes the PAS session.

• Expected Outcome

Pass verdict
- The PIM Access Service session is closed AND
- The OBEX DISCONNECT response message of the PAS has been exchanged properly.

Additional fields may be present in the requests and responses.
• **GPP/GSM/BV-14-I [PIMSE Closes a GPP session when both PAS and PNS are active]**

Test Purpose

Verify that the PIMSE can close a GPP session.

• Reference

[3] Section 4.2.3

• Initial Condition

A GPP session with active PAS and PNS sessions is ongoing between the IUT and the Lower Tester.

• Test Procedure

1. The Lower Tester sends the notification status ‘off’ to the IUT using the function ‘SetNotificationRegistration’.
2. The IUT disconnects the GPP PNS session by sending an OBEX DISCONNECT request.

The Lower Tester disconnects the GPP PAS session by sending an OBEX DISCONNECT request.

• Expected Outcome

**Pass verdict**

- Both the PIM Access Service session and the PIM Notification Service sessions are closed AND
- The OBEX DISCONNECT response messages of both the PAS and PNS have been exchanged properly.

Additional fields may be present in the requests and responses.

• **GPP/GSM/BV-15-I [PIMSE Responds to an open GPP session request with multiple PIM Access Service and PIM Notification Service]**

Test Purpose

Verify that the PIMSE can properly respond to a GPP-based session establishment request that involves two PIM Access Service instances and a PIM Notification Service.

• Reference

[3] Section 4.2.2

• Initial Condition

- Lower Tester: The IUT and the Lower Tester have been paired and have implemented an application profile based on GPP. Both IUT and Lower Tester support a notification feature based on the requirements of the PIM Notification Service.
• IUT: The IUT is in discoverable and connectable mode.
  - Both the Lower Tester and the IUT support multiple PAS instances simultaneously.

• Test Procedure
  1. The Lower Tester connects to the IUT by sending an OBEX CONNECT request to two PIM Access Service instances of the IUT.
  2. The Lower Tester sends the notification status ‘on’ to the IUT using the function ‘SetNotificationRegistration’ for both PAS instances.
  3. The IUT connects to the Lower Tester by sending an OBEX CONNECT request to the PIM Notification Service of the Lower Tester.

• Expected Outcome

  Pass verdict
  - The OBEX CONNECT response messages of both the PAS and PNS have been exchanged properly AND
  - The two PIM Access Service instances and the PIM Notification Service are established.

  Additional fields may be present in the requests and responses.

• GPP/GSM/BV-16-I [PIMSE Closes a GPP session with multiple active PIM Access Service instances and an activated PIM Notification Service including deregistration of the Notification Service]

  Test Purpose

  Verify that the PIMSE can close a GPP session that involves two PIM Access Service instances and a PIM Notification Service, including the deregistration of the PIM Notification Service.

• Reference

  [3] Section 4.2.3

• Initial Condition

  The Lower Tester is engaged in a GPP session with the IUT. Two PIM Access Service instance connections and the PIM Notification Service are in use.

• Test Procedure
  1. The Lower Tester sends the notification status ‘off’ to the IUT using the function ‘SetNotificationRegistration’ for both PAS instances.
  2. The IUT disconnects the PNS session by sending an OBEX DISCONNECT request.

  The Lower Tester disconnects the two PAS sessions by sending an OBEX DISCONNECT request.
• Expected Outcome

Pass verdict
- Both the two PIM Access Service session and the PIM Notification Service sessions are closed AND
- The OBEX DISCONNECT response messages of both the PAS and PNS have been exchanged properly.

Additional fields may be present in the requests and responses.

• GPP/GSM/BV-17-I [PIMSE Closes a GPP session with multiple active PIM Access Service instances and an activated PIM Notification Service without deregistration of the Notification Service] Test Purpose

Verify that the PIMSE can close a GPP session that involves two PIM Access Service instances and a PIM Notification Service, without deregistration of the PIM Notification Service.

• Reference

[3] Section 4.2.3

• Initial Condition

The Lower Tester is engaged in a GPP session with the IUT. Two PIM Access Service instance connections and the PIM Notification Service are in use.

• Test Procedure

1. The Lower Tester disconnects the two PAS sessions by sending an OBEX DISCONNECT request.

2. The IUT disconnects the PNS session by sending an OBEX DISCONNECT request.

• Expected Outcome

Pass verdict
- Both the two PIM Access Service sessions and the PIM Notification Service session are closed AND
- The OBEX DISCONNECT response messages of both the PAS and PNS have been exchanged properly.

Additional fields may be present in the requests and responses.

4.3 Instance Handling

The purpose of the tests described in this section is to verify the instance management of the PIM devices.
4.3.1 IUT – PIM Client Equipment (PIMCE)

The purpose of the tests described in this section is to verify that the PIM Client Equipment device can properly handle PIM instances.

- GPP/GIH/BV-01-I: PIMCE retrieves the PAS instance description from the PIMSE

  Test Purpose

  Verify that the PIMCE can retrieve a description of the PAS-instance from the PIMSE.

- Reference

  [3] Section 5.9

- Initial Condition

  The IUT and the Lower Tester have established a PAS connection.

- Test Procedure

  1. The IUT sends a ‘GetInstanceInformation’ request to the Lower Tester.
  2. The Lower Tester delivers the requested PAS-instance description and optional further instance information in its response.

- Expected Outcome

  Pass verdict

  - The request of the ‘GetInstanceInformation’ function is well formatted according to [3] AND
  - The PAS-instance description string can be displayed properly on the IUT.

  Additional fields may be present in the requests and responses.

4.3.2 IUT – PIM Server Equipment (PIMSE)

The purpose of the tests described in this section is to verify that the PIM Server Equipment device can properly handle PIM instances.

- GPP/GIH/BV-11-I [PIMSE returns the PAS-instance description to the PIMCE]

  Test Purpose

  Verify that the PIMSE can return a description of the PAS-instance to the PIMCE.

- Reference

  [3] Section 5.9

- Initial Condition

  The IUT and the Lower Tester have established a PAS connection.

- Test Procedure
1. The IUT receives a 'GetInstanceInformation' request from the Lower Tester.
2. The IUT delivers the requested PAS-instance description by the 'Description' header in its response.

- **Expected Outcome**

  **Pass verdict**
  The response of the 'GetInstanceInformation' function is well formatted according to [3]. Additional fields may be present in the requests and responses.

- **Reference**

  [3] Section 5.9

- **Initial Condition**

  The IUT and the Lower Tester have established a PAS connection

- **Test Procedure**

  The IUT receives a 'GetInstanceInformation' request from the Lower Tester with an invalid InstanceID.

- **Expected Outcome**

  **Pass verdict**
  The IUT rejects the 'GetInstanceInformation' request and sends an error in its response. Additional fields may be present in the requests and responses.

- **Reference**

  [3] Section 5.10

- **Initial Condition**
The IUT and the Lower Tester have established a GPP session. In that GPP session, the PIM Access Service is active.

- **Test Procedure**
  1. A new literal object not currently included in the IUT’s repository has been sent to or created on the remote server of the IUT.
  2. The Lower Tester sends a ‘SyncInstance’ request to the IUT and the IUT contacts the remote server and loads the new object to the related folder (e.g. its ‘Inbox’).
  3. The Lower Tester requests the object-listing of the folder.

- **Expected Outcome**
  
  **Pass verdict**
  
  - The response of the ‘SyncInstance’ function is well formatted according to [3] AND
  - The Lower Tester is able to receive the object-listing of the IUT’s folder and correctly display it with the new object.

  Additional fields may be present in the requests and responses.

### 4.4 Notification Registration

The purpose of the tests described in this section is to verify the normal behavior of the components necessary to realize the PIM Notification Registration feature.

#### 4.4.1 IUT – PIM Client Equipment (PIMCE)

The purpose of the tests described in this section is to check that the PIM Client Equipment device can properly take advantage of the PIM Notification Registration feature.

- **GPP/GNR/BV-01-I [PIMCE Switches Notification to ‘off’ Status] Test Purpose**

  Verify that the PIMCE can switch off the Notification Service of the PIMSE.

- **Reference**

  [3] Section 5.3

- **Initial Condition**

  The IUT and the Lower Tester have established a GPP session and both the PIM Access Service and the PIM Notification Service are active (Notification status ‘on’).

- **Test Procedure**

  The IUT sends the notification status ‘off’ to the Lower Tester using the function ‘SetNotificationRegistration’.

- **Expected Outcome**
Pass verdict
- The request of the ‘SetNotificationRegistration’ function is well formatted according to [3]
  AND
- The PNS session can be properly terminated by the Lower Tester by sending an OBEX DISCONNECT to the IUT.

Additional fields may be present in the requests and responses.

- GPP/GNR/BV-02-I [PIMCE switches Notification to ‘on’ status]

Test Purpose
Verify that the PIMCE can switch on the Notification Service of the PIMSE.

- Reference
[3] Section 5.3

Initial Condition
The IUT and the Lower Tester have established a GPP PAS session, and the PIM Notification Service is not connected (Notification status ‘off’).

Test Procedure
1. The IUT sends the notification status ‘on’ to the Lower Tester using the function ‘SetNotificationRegistration’.
2. The Lower Tester connects to the OBEX PIM Notification Service of the IUT.

Expected Outcome
Pass verdict
- The request of the ‘SetNotificationRegistration’ function is well formatted according to [3]
  AND
- The PIM Notification Service is connected following the OBEX CONNECT sent by the Lower Tester to the IUT.

Additional fields may be present in the requests and responses.

4.4.2 IUT – PIM Server Equipment (PIMSE)
The purpose of the tests described in this section is to verify that the PIM Server Equipment device can properly implement the PIM Notification Registration feature.

- GPP/GNR/BV-11-I [PIMSE terminates PIM Notification]

Test Purpose
Verify that the PIMSE can terminate the PIM Notification Service.

- Reference
[3] Section 5.3
• Initial Condition

The IUT and the Lower Tester have established a GPP session and both the PIM Access Service and the PIM Notification Service are active (Notification status ‘on’).

• Test Procedure

The Lower Tester sends the notification status ‘off’ to the IUT using the function ‘SetNotificationRegistration’.

• Expected Outcome

Pass verdict
- The response of the ‘SetNotificationRegistration’ function is well formatted according to [3] AND
- The IUT terminates the PNS session by sending an OBEX DISCONNECT to the Lower Tester.

Additional fields may be present in the requests and responses.

• GPP/GNR/BV-12-I [PIMSE starts PIM Notification] Test Purpose

Verify that the PIMSE can establish the PIM Notification Service.

• Reference

[3] Section 5.3

• Initial Condition

The IUT and the Lower Tester have established a GPP PAS session and the PIM Notification Service is not connected (Notification status ‘off’).

• Test Procedure

The Lower Tester sends the notification status ‘on’ to the IUT using the function ‘SetNotificationRegistration’.

• Expected Outcome

Pass verdict
- The response of the ‘SetNotificationRegistration’ function is well formatted according to [3] AND
- The IUT connects to the Lower Tester’s PNS by sending an OBEX CONNECT to the Lower Tester.

Additional fields may be present in the requests and responses.
4.5 Browsing

The purpose of the tests described in this section is to verify that the Browsing in the PIMSE’s repository is properly implemented.

4.5.1 IUT – PIM Client Equipment (PIMCE)

The purpose of the tests described in this section is to verify that the functions specific to the Browsing in the object repository are properly implemented by the PIMCE.

- **GPP/GBR/BV-01-I [PIMCE selects the current folder on PIMSE] Test Purpose**

  Verify that the PIMCE can set the current folder on the PIMSE.

- **Reference**

  [3] Section 5.4

- **Initial Condition**

  - The IUT and the Lower Tester have established a GPP session.
  - Lower Tester: The Lower Tester’s repository contains at least one folder.

- **Test Procedure**

  The IUT sends a ‘SetFolder’ command to the Lower Tester, targeting one of the GPP virtual folders supported by the Lower Tester.

- **Expected Outcome**

  Pass verdict

  - The request of the ‘SetFolder’ function is well formatted according to [3] AND
  - The current folder on the PIMSE is set to the requested folder.

  Additional fields may be present in the requests and responses.

- **GPP/GBR/BV-02-I [PIMCE Retrieves a Listing Object] Test Purpose**

  Verify that the PIMCE can retrieve a listing of literal objects from the PIMSE.

- **Reference**

  [3] Section 5.5

- **Initial Condition**

  - The IUT and the Lower Tester have established a GPP session. In that GPP session, the PIM Access Service is active.
  - IUT: The IUT has set the current folder of the Lower Tester to a non-empty folder.
  - Lower Tester: The Lower Tester contains at least one folder that is not empty.
• Test Procedure

1. The IUT requests the object-listing of the current folder.
2. The Lower Tester delivers the requested object-listing object.

• Expected Outcome

Pass verdict
- The request of the 'GetObjectListing' function is well formatted according to [3] AND
- The IUT is able to receive the object-listing and correctly display it.

Additional fields may be present in the requests and responses.

4.5.2 IUT – PIM Server Equipment (PIMSE)

The purpose of the tests described in this section is to verify that the functions specific to the Browsing in the object repository are properly implemented by the PIMSE.

• GPP/GBR/BV-11-I [PIMSE Sets its Current Folder] Test Purpose

Verify that the PIMSE changes the current folder as requested by the PIMCE.

• Reference

[3] Section 5.4

• Initial Condition

- The IUT and the Lower Tester have established a GPP session.
- IUT: The IUT’s repository contains at least one folder.

• Test Procedure

The Lower Tester sends a 'SetFolder' request targeting one of the GPP virtual folders supported by the IUT.

• Expected Outcome

Pass verdict
- The response of the 'SetFolder' function is well formatted according to [3] AND
- The current folder on the PIMSE is set to the requested folder.

Additional fields may be present in the requests and responses.

• GPP/GBR/BI-11-I [PIMSE Rejects an Invalid Folder Request] Test Purpose

Verify that the PIMSE can reject requests from the PIMCE to non-existing folders.

• Reference
[3] Section 5.4

- **Initial Condition**
  The IUT and the Lower Tester have established a GPP session.

- **Test Procedure**
  The Lower Tester sends a 'SetFolder' request targeting a folder that doesn't exist in the IUT's repository.

- **Expected Outcome**
  **Pass verdict**
  - The IUT rejects the request and sends an error in its response.
  - Additional fields may be present in the requests and responses.

- **GPP/GBR/BV-12-I [PIMSE Returns a Listing Object] Test Purpose**
  Verify that the PIMSE can return a listing of literal objects to the PIMCE.

- **Reference**
  [3] Section 5.5

1.0.1.1

- **Initial Condition**
  - The IUT and the Lower Tester have established a GPP session. In that GPP session, the PIM Access Service is active.
  - Lower Tester: The Lower Tester has set the current folder to a non-empty folder.
  - IUT: The IUT contains at least one folder that is not empty.

- **Test Procedure**
  The Lower Tester requests the object-listing of the current folder.

- **Expected Outcome**
  **Pass verdict**
  The response of the 'GetObjectListing' function is well formatted according to [3].
  Additional fields may be present in the requests and responses.

### 4.6 Object Handling

The purpose of the tests described in this section is to verify that handling of the literal objects is properly implemented.
4.6.1  IUT – PIM Client Equipment (PIMCE)

The purpose of the tests described in this section is to verify that the functions specific to the handling of the literal objects in the PIMSE’s repository are properly implemented by the PIMCE.

- **GPP/GOH/BV-01-I [PIMCE Retrieves a Literal PIM Object]** Test Purpose
  
  Verify that the PIMCE can retrieve a literal PIM object from the PIMSE.

- **Reference**
  
  [3] Section 5.6

- **Initial Condition**
  
  - The IUT and the Lower Tester have established a GPP session. In that GPP session, the PIM Access Service is active.
  - IUT: The IUT has set the current folder of the Lower Tester to a folder that includes at least one literal PIM object. The IUT has retrieved the listing of this folder.
  - Lower Tester: The Lower Tester contains at least one folder that includes at least one literal PIM object.

- **Test Procedure**

  1. The IUT requests one of the PIM objects contained in the folder.
  2. The Lower Tester delivers the requested literal PIM object.

- **Expected Outcome**

  **Pass verdict**
  
  - The request of the 'GetObject' function is well formatted according to [3] AND
  - The IUT is able to receive the literal PIM object and correctly display it.

  Additional fields may be present in the requests and responses.

4.6.1.1  GPP/GOH/BV-02-I [PIMCE uploads a literal object to the PIMSE]

- **Test Purpose**

  Verify that the PIMCE can upload a literal PIM object to the PIMSE.

- **Reference**

  [3] Section 5.7

- **Initial Condition**

  - The IUT and the Lower Tester have established a GPP session. In this session, the PIM Access Service is active.
• Test Procedure

The IUT sends a 'PushObject' request to one of the GPP virtual folders supported by the Lower Tester.

• Expected Outcome

Pass verdict
- The request of the 'PushObject' function is well formatted according to [3] AND
- The literal object is received by the Lower Tester and stored correctly in the addressed folder.

Additional fields may be present in the requests and responses.

• GPP/GOH/BV-03-I [PIMCE deletes a literal object on the PIMSE] Test Purpose

Verify that the PIMCE can delete a literal PIM object on the PIMSE.

• Reference

[3] Section 5.8

• Initial Condition

- IUT: The IUT contains at least one literal PIM object. The IUT has set the current folder on the Lower Tester to the folder it wants to push an object to.

- IUT: The IUT and the Lower Tester have established a GPP session. In that GPP session, the PIM Access Service is active.

- IUT: The IUT has set the current folder of the Lower Tester to one non-empty folder. The IUT has retrieved an object-listing of this folder.

- Lower Tester: The Lower Tester contains at least one non-empty folder.

• Test Procedure

The IUT requests the Lower Tester to delete one literal object that was contained in the folder.

• Expected Outcome

Pass verdict
- The request of the 'DeleteObject' function is well formatted according to [3] AND
- The literal PIM object has been deleted from the Lower Tester's folder.

Additional fields may be present in the requests and responses.
4.6.2 IUT – PIM Server Equipment (PIMSE)

The purpose of the tests described in this section is to verify that the functions specific to the handling of the literal objects in the PIMSE’s repository are properly implemented by the PIMSE.

- **GPP/GOH/BV-11-I [PIMSE returns a literal PIM object]**
  
  **Test Purpose**
  
  Verify that the PIMSE can return a literal PIM object to the PIMCE.

  **Reference**
  
  [3] Section 5.6

  **Initial Condition**
  
  - The IUT and the Lower Tester have established a GPP session. In that GPP session, the PIM Access Service is active.
  
  - Lower Tester: The Lower Tester has set the current folder of the IUT to a folder that includes at least one literal PIM object. The Lower Tester has retrieved the listing of this folder.
  
  - IUT: The IUT contains at least one folder that includes at least one literal PIM object.

  **Test Procedure**
  
  1. The Lower Tester requests one of the literal PIM objects contained in the folder.
  2. The IUT delivers the requested literal PIM object.

  **Expected Outcome**
  
  Pass verdict
  
  The response of the ‘GetObject’ function is well formatted according to [3]. Additional fields may be present in the requests and responses.

- **GPP/GOH/BI-11-I [PIMSE rejects an invalid request for a literal PIM object]**

  **Test Purpose**
  
  Verify that the PIMSE can reject a request for a non-existing literal PIM object.

  **Reference**
  
  [3] Section 5.6

  **Initial Condition**
  
  - The IUT and the Lower Tester have established a GPP session. In that GPP session, the PIM Access Service is active.
  
  - Lower Tester: The Lower Tester has set the current folder of the IUT to a folder that includes at least one literal PIM object.
  
  - IUT: The IUT contains at least one folder that includes at least one literal PIM object.
• Test Procedure

The Lower Tester requests a literal PIM object that doesn't exist in the folder.

• Expected Outcome

Pass verdict
The IUT rejects the request of the Lower Tester to retrieve the non-existing object and sends an error in its response.
Additional fields may be present in the requests and responses.

• GPP/GOH/BV-12-I [PIMSE Receives a literal object from the PIMCE] Test Purpose

Verify that the PIMSE can receive a literal PIM object uploaded by the PIMCE.

• Reference

[3] Section 5.7

• Initial Condition

- The IUT and the Lower Tester have established a GPP session. In this session, the PIM Access Service is active.
- IUT: The IUT shall have at least one folder.
- Lower Tester: The Lower Tester contains at least one literal PIM object. The PIMCE has set the current folder on the Lower Tester to the folder it wants to push the literal object to.

• Test Procedure

The Lower Tester sends a 'PushObject' request to the IUT.

• Expected Outcome

Pass verdict
- The response of the 'PushObject' function is well formatted according to [3] AND
- The literal PIM object is received by the IUT and stored correctly in the addressed folder.
Additional fields may be present in the requests and responses.

• GPP/GOH/BV-13-I [PIMSE Deletes a Literal Object] Test Purpose

Verify that the PIMSE can delete a literal PIM object on request of the PIMCE.

• Reference

[3] Section 5.8
1.0.1.1 Initial Condition
- The IUT and the Lower Tester have established a GPP session. In that GPP session, the PIM Access Service is active.
- IUT: The current folder of the IUT has been set to one non-empty folder.
- Lower Tester: The Lower Tester has received an object listing of this folder.

• Test Procedure
The Lower Tester requests the IUT to delete one literal object from its folder.

• Expected Outcome
Pass verdict
- The response of the 'DeleteObject' function is well formatted according to [3] AND
- The literal PIM object has been deleted from the IUT’s folder.

Additional fields may be present in the requests and responses.

4.7 Notification
The purpose of the tests described in this section is to verify the normal behavior of the components necessary to realize the PIM Notification.

4.7.1 IUT – PIM Client Equipment (PIMCE)
The purpose of the tests described in this section is to verify that the PIM Client Equipment device can properly take advantage of the PIM Notification.

• GPP/GNO/BV-01-I [PIMCE Receives a Notification] Test Purpose
Verify that the PIMCE is properly notified about changes in the PIMSE’s object repository.

• Reference
[3] Section 5.2

• Initial Condition
The IUT and the Lower Tester have established a GPP session and the PIM Notification Service is active.

• Test Procedure
The Lower Tester sends a notification event to the IUT, in order to advertise a change in its object repository.

• Expected Outcome
Pass verdict
- The IUT can receive and decode the notification-event object AND
- The response of the 'SendEvent' function is well formatted according to [3]

Additional fields may be present in the requests and responses.

Notes:

The kind of change in the PIMSE’s repository has to be defined by the application profile (e.g. new object, deleted object etc.). It is recommended to perform this test for each event type of the application profile.

### 4.7.2 IUT – PIM Server Equipment (PIMSE)

The purpose of the tests described in this section is to verify that the PIM Server Equipment device has properly implemented the PIM Notification.

- **GPP/GNO/BV-11-I [PIMSE Receives a Notification] Test Purpose**
  
  Verify that the PIMSE can send a notification.

- **Reference**
  
  [3] Section 5.2

- **Initial Condition**
  
  - The IUT and the Lower Tester have established a GPP session and the PIM Notification Service is active.
  
  - IUT: The attribute ‘PASInstanceID’ of the related SDP record has the value i (see also ‘Notes’ below).

- **Test Procedure**
  
  Take action so there is a change in the IUT’s object repository. Accordingly, the IUT sends a notification event to the Lower Tester.

- **Expected Outcome**

  **Pass verdict**
  
  - The IUT sends a notification event to the Lower Tester AND
  
  - The request of the 'SendEvent' function is well formatted according to [3] and its application parameter PASInstanceID has the value i.

  Additional fields may be present in the requests and responses.

  - Notes: The kind of change in the PIMSE’s repository has to be defined by the application profile (e.g. new object, deleted object etc.). It is recommended to perform this test for each event type of the application profile.

  - The test should be repeated for each instance of the application profile.
- The instance-ID ‘i’ (see ‘initial condition’ above) should be defined in the IXIT of the application profile.

### 4.8 Account Handling

The purpose of the tests described in this section is to verify that the GPP accounts can be handled properly.

#### 4.8.1 IUT – PIM Client Equipment (PIMCE)

The purpose of the tests described in this section is to verify that the PIM Client Equipment PIMCE can properly handle GPP PAS accounts.

- **GPP/GAH/BV-01-I** [PIMCE initiates an external synchronization of the PAS instance] Test Purpose

  Verify that the PIMCE can initiate an update or synchronization of the repository of a PAS instance, e.g. to update it with new objects loaded from an external server.

- **Reference**

  [3] Section 5.10

- **Initial Condition**

  The IUT and the Lower Tester have established a GPP session. In that GPP session, the PIM Access Service is active.

- **Test Procedure**

  1. The IUT requests the update or sync of the object listing of a suitable folder on the Lower Tester (e.g. ‘Inbox’) by a ‘SyncInstance’ request.

  2. The Lower Tester simulates an external sync or update with a remote server and adds new objects to the listing in the folder.

  3. The IUT requests the updated listing of folder.

- **Expected Outcome**

  **Pass verdict**

  - The request of the ‘SyncInstance’ function is well formatted according to [3] AND

  - The IUT is able to receive the listing of the Lower Tester’s folder updated by the new objects.

  Additional fields may be present in the requests and responses.
5 Test Case Mapping

As GPP is an abstract profile there is no test case mapping for the test case templates defined in this document. Hence, the test case mapping shall be defined in the specific application profile test specification.

For the same reason, GPP provides no ICS or IXIT documents.