

# Automation IO Profile (AIOP)

## **Bluetooth® Test Suite**

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- **Prepared during TCRL:** TCRL.2023-1



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# 1 Scope

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This Bluetooth document contains the Test Suite Structure (TSS) and test cases to test the implementation of the Bluetooth Automation IO Profile Specification with the objective to provide a high probability of air interface interoperability between the tested implementation and other manufacturers' Bluetooth devices.

## 2 References, definitions, and abbreviations

---

### 2.1 References

This document incorporates provisions from other publications by dated or undated reference. These references are cited at the appropriate places in the text, and the publications are listed hereinafter. Additional definitions and abbreviations can be found in [1] and [2].

- [1] Test Strategy and Terminology Overview
- [2] Bluetooth Core Specification, Version 4.0 or later
- [3] Automation IO Profile Specification, Version 1.0
- [4] ICS Proforma for Automation IO Profile, AIOP.ICS
- [5] GATT Test Suite, GATT.TS
- [6] Automation IO Service Specification, Version 1.0
- [7] Automation IO Service Test Suite, AIOS.TS
- [8] IXIT Proforma for Automation IO Service
- [9] Characteristic and Descriptor descriptions are accessible via the [Bluetooth SIG Assigned Numbers](#)

### 2.2 Definitions

In this Bluetooth document, the definitions from [1] and [2] apply.

### 2.3 Acronyms and abbreviations

In this Bluetooth document, the definitions, acronyms, and abbreviations from [1] and [2] apply.

## 3 Test Suite Structure (TSS)

### 3.1 Overview

The Automation IO Profile requires the presence of GAP, SM (for LE), SDP (for BR/EDR), and GATT. This is illustrated in [Figure 3-1](#).

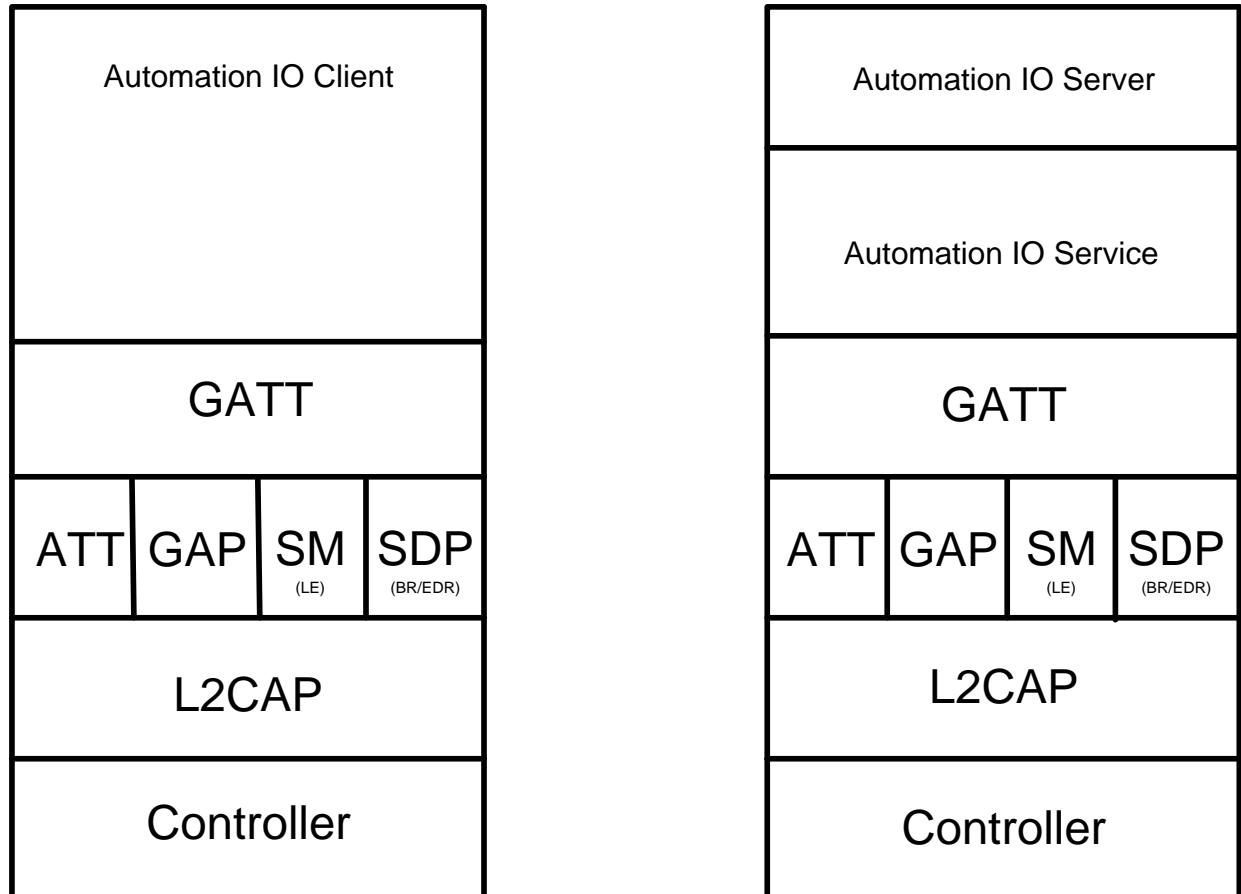


Figure 3-1: Automation IO test model

### 3.2 Test Strategy

The test objectives are to verify the functionality of the Automation IO Profile within a Bluetooth Host and enable interoperability between Bluetooth Hosts on different devices. The testing approach covers mandatory and optional requirements in the specification and matches these to the support of the IUT as described in the ICS [4]. Any defined test herein is applicable to the IUT if the ICS logical expression defined in the Test Case Mapping Table (TCMT) evaluates to true.

The test equipment provides an implementation of the Radio Controller and the parts of the Host needed to perform the test cases defined in this Test Suite. A Lower Tester acts as the IUT's peer device and interacts with the IUT over-the-air interface. The configuration, including the IUT, needs to implement similar capabilities to communicate with the test equipment. For some test cases, it is necessary to stimulate the IUT from an Upper Tester. In practice, this could be implemented as a special test interface, a Man Machine Interface (MMI), or another interface supported by the IUT.

This Test Suite contains Valid Behavior (BV) tests complemented with Invalid Behavior (BI) tests where required. The test coverage mirrored in the Test Suite Structure is the result of a process that started with

catalogued specification requirements that were logically grouped and assessed for testability enabling coverage in defined test purposes.

### 3.3 Test groups

The following test groups have been defined:

- Generic GATT Integrated Tests
- Features



## 4 Test cases (TC)

### 4.1 Introduction

#### 4.1.1 Test case identification conventions

Test cases are assigned unique identifiers per the conventions in [2]. The convention used here is:

**<spec abbreviation>/<IUT role>/<class>/<feat>/<func>/<subfunc>/<cap>/<xx>-<nn>-<y>.**

Additionally, testing of this specification includes tests from the GATT Test Suite [8] referred to as Generic GATT Integrated Tests (GGIT); when used, the GGIT tests are referred to through a TCID string using the following convention:

**<spec abbreviation>/<IUT role>/<GGIT test group>/< GGIT class >/<xx>-<nn>-<y>.**

Identifier Abbreviation	Spec Abbreviation Identifier <spec abbreviation>
AIOP	Automation IO Profile
Identifier Abbreviation	Role Abbreviation Identifier <IUT role>
CL	Client Role
SR	Server Role
Identifier Abbreviation	Reference Identifier <GGIT test group>
CGGIT	Client Generic GATT Integrated Tests
SGGIT	Server Generic GATT Integrated Tests
Identifier Abbreviation	Reference Identifier <GGIT class>
CHA	Characteristic
DES	Descriptor
SDPNF	SDP Record Not Found
SER	Service
Identifier Abbreviation	Feature Abbreviation Identifier <feat>
AIOF	Features

Table 4-1: Automation IO TC feature naming conventions

#### 4.1.2 Conformance

When conformance is claimed for a particular specification, all capabilities are to be supported in the specified manner. The mandated tests from this Test Suite depend on the capabilities to which conformance is claimed.

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 not excluded by the specification
- That capabilities enabled by the implementations are sustained over durations expected by the use case
- That the implementation gracefully handles any quantity of data expected by the use case

- That in cases where more than one valid interpretation of the specification exists, the implementation complies with at least one interpretation and gracefully handles other interpretations
- That the implementation is immune to attempted security exploits

A single execution of each of the required tests is required to constitute a Pass verdict. However, it is noted that 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 generated by Launch Studio, with the test case as described in the Test Suite, or with the test system utilized, the member is required to notify the responsible party via an erratum request such that the issue may be addressed.

#### 4.1.3 Pass/Fail verdict conventions

Each test case has an Expected Outcome section. The IUT is granted the Pass verdict when all the detailed pass criteria conditions within the Expected Outcome section are met.

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

## 4.2 Setup preambles

The procedures defined in this section are provided for information, as they are used by test equipment in achieving the initial conditions in certain tests.

### 4.2.1 Set up LE Transport

Use GATT.TS [5] Section 4.2.1.2: Preamble [Set up ATT Bearer over LE].

### 4.2.2 Set up BR/EDR/HS Transport

Use GATT.TS [5] Section 4.2.1.1: Preamble [Setup ATT Bearer over BR/EDR].

### 4.3 Generic GATT Integrated Tests

Execute the Generic GATT Integrated Tests defined in [5] Section 6.3, Server Test Procedures, and Section 6.4, Client Test Procedures, using Table 4-2 below as input:

TCID	Service / Characteristic / Descriptor	Reference	Properties	Value Length (Octets)	Service Type
AIOP/CL/CGGIT/SER/BV-01-C [Service GGIT – Automation IO Service]	Automation IO Service	[3] 4.2	-	-	Primary Service
AIOP/SR/SGGIT/SDPNF/BV-01-C [Not discoverable over BR/EDR – Automation IO Service]	Automation IO Service	[3] 2.5	-	-	-
AIOP/CL/CGGIT/CHA/BV-01-C [Characteristic GGIT – Digital Characteristic – Notify]	Digital Characteristic	[3] 4.3.1.1, 4.4	0x1E (Read, Write, Write without Response, Notify)	Variable	-
AIOP/CL/CGGIT/CHA/BV-04-C [Characteristic GGIT – Digital Characteristic – Indicate]	Digital Characteristic	[3] 4.3.1.1, 4.4	0x2E (Read, Write, Write without Response, Indicate)	Variable	-
AIOP/CL/CGGIT/CHA/BV-02-C [Characteristic GGIT – Analog Characteristic – Notify]	Analog Characteristic	[3] 4.3.1.2, 4.5	0x1E (Read, Write, Write without Response, Notify)	2	-
AIOP/CL/CGGIT/CHA/BV-05-C [Characteristic GGIT – Analog Characteristic – Indicate]	Analog Characteristic	[3] 4.3.1.2, 4.5	0x2E (Read, Write, Write without Response, Indicate)	2	-
AIOP/CL/CGGIT/CHA/BV-03-C [Characteristic GGIT – Aggregate Characteristic – Notify]	Aggregate Characteristic	[3] 4.3.1.3	0x12 (Read, Notify)	Variable	-
AIOP/CL/CGGIT/CHA/BV-06-C [Characteristic GGIT – Aggregate Characteristic – Indicate]	Aggregate Characteristic	[3] 4.3.1.3	0x22 (Read, Indicate)	Variable	-
AIOP/CL/CGGIT/DES/BV-01-C [Descriptor GGIT – Digital Value Trigger Setting Descriptor]	Digital Value Trigger Setting Descriptor	[3] 4.3.1.1, 4.4	0x0A (Read, Write)	Variable	-
AIOP/CL/CGGIT/DES/BV-02-C [Descriptor GGIT – Analog Value Trigger Setting Descriptor]	Analog Value Trigger Setting Descriptor	[3] 4.3.1.2, 4.5	0x0A (Read, Write)	Variable	-



TCID	Service / Characteristic / Descriptor	Reference	Properties	Value Length (Octets)	Service Type
<a href="#">AIOP/CL/CGGIT/DES/BV-03-C [Descriptor GGIT – Digital Time Trigger Setting Descriptor]</a>	Digital Time Trigger Setting Descriptor	<a href="#">[3]</a> 4.3.1.1, 4.4	0x0A (Read, Write)	Variable	-
<a href="#">AIOP/CL/CGGIT/DES/BV-04-C [Descriptor GGIT – Analog Time Trigger Setting Descriptor]</a>	Analog Time Trigger Setting Descriptor	<a href="#">[3]</a> 4.3.1.2, 4.5	0x0A (Read, Write)	Variable	-
<a href="#">AIOP/CL/CGGIT/DES/BV-05-C [Descriptor GGIT – Digital Characteristic Presentation Format Descriptor]</a>	Digital Characteristic Presentation Format Descriptor	<a href="#">[3]</a> 4.3.1.1	0x02 (Read)	7	-
<a href="#">AIOP/CL/CGGIT/DES/BV-06-C [Descriptor GGIT – Analog Characteristic Presentation Format Descriptor]</a>	Analog Characteristic Presentation Format Descriptor	<a href="#">[3]</a> 4.3.1.2	0x02 (Read)	7	-
<a href="#">AIOP/CL/CGGIT/DES/BV-07-C [Descriptor GGIT – Digital User Description Descriptor]</a>	Digital User Description Descriptor	<a href="#">[3]</a> 4.3.1.1	0x02 (Read)	Variable	-
<a href="#">AIOP/CL/CGGIT/DES/BV-08-C [Descriptor GGIT – Analog User Description Descriptor]</a>	Analog User Description Descriptor	<a href="#">[3]</a> 4.3.1.2	0x02 (Read)	Variable	-
<a href="#">AIOP/CL/CGGIT/DES/BV-09-C [Descriptor GGIT – Digital Characteristic Extended Properties Descriptor]</a>	Digital Characteristic Extended Properties Descriptor	<a href="#">[3]</a> 4.3.1.1	0x02 (Read)	2	-
<a href="#">AIOP/CL/CGGIT/DES/BV-10-C [Descriptor GGIT – Analog Characteristic Extended Properties Descriptor]</a>	Analog Characteristic Extended Properties Descriptor	<a href="#">[3]</a> 4.3.1.2	0x02 (Read)	2	-
<a href="#">AIOP/CL/CGGIT/DES/BV-11-C [Descriptor GGIT – Digital Characteristic Number of Digitals Descriptor]</a>	Digital Characteristic Number of Digitals Descriptor	<a href="#">[3]</a> 4.3.1.1	0x02 (Read)	1	-

Table 4-2: Input for the GGIT Server Test Procedure



## 4.4 Automation IO Features

### 4.4.1 Configure Notification

- Test Purpose

Verify that an Automation IO Client IUT can configure the Digital, Analog or Aggregate characteristic values for notification.

- Reference

[3] 4.4, 4.5, 4.6

- Initial Condition

- Establish an ATT Bearer connection between the Lower Tester and IUT as defined in Section 4.2.1 if using the LE transport or Section 4.2.2 if using the BR/EDR transport.
- The Lower Tester includes one instantiation of the Automation IO Service [6] which includes one instantiation of each of the Digital, Analog and Aggregate characteristics. The Digital, Analog and Aggregate characteristic definitions each contain an associated Client Characteristic Configuration characteristic descriptor.
- The IUT has executed [AIOP/CL/CGGIT/CHA/BV-01-C \[Characteristic GGIT – Digital Characteristic – Notify\]](#), [AIOP/CL/CGGIT/CHA/BV-02-C \[Characteristic GGIT – Analog Characteristic – Notify\]](#), and/or [AIOP/CL/CGGIT/CHA/BV-03-C \[Characteristic GGIT – Aggregate Characteristic – Notify\]](#) and saved the handle of each Client Characteristic Configuration descriptor.

- Test Case Configuration

Test Case
<a href="#">AIOP/CL/AIOF/BV-05-C [Digital Configure Notification]</a>
<a href="#">AIOP/CL/AIOF/BV-06-C [Analog Configure Notification]</a>
<a href="#">AIOP/CL/AIOF/BV-07-C [Aggregate Configure Notification]</a>

Table 4-3: Configure Notification

- Test Procedure

1. Send an Upper Tester command to the IUT to configure the characteristic value for notifications by writing 0x0001 to the associated Client Characteristic Configuration descriptor.

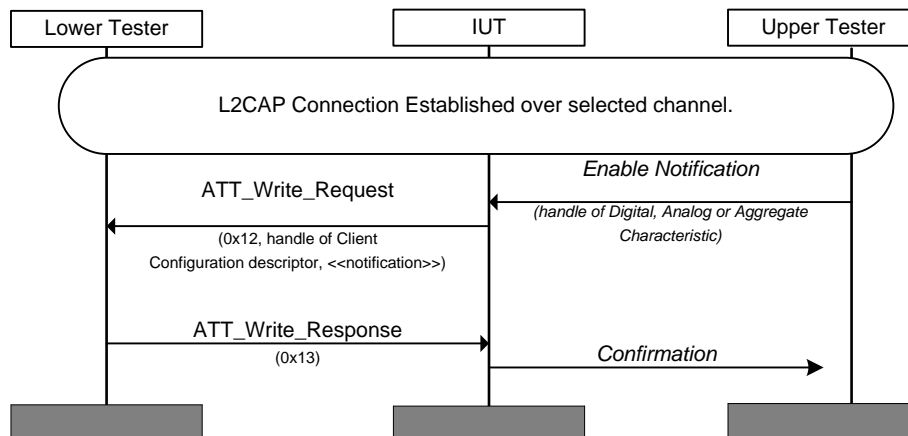


Figure 4-1: Configure Notification

- Expected Outcome

#### Pass verdict

The IUT sends a correctly formatted *ATT\_Write\_Request* (0x12) to the Lower Tester, with the handle set to that of the associated Client Characteristic Configuration Descriptor, and the value matches the value requested by the Upper Tester.

### 4.4.2 Receive Notifications

- Test Purpose

Verify that an Automation IO Client IUT can receive notifications of the Digital, Analog or Aggregate characteristic values.

- Reference

[3] 4.4, 4.5, 4.6

- Initial Condition

- Establish an ATT Bearer connection between the Lower Tester and IUT as defined in Section 4.2.1 if using the LE transport or Section 4.2.2 if using the BR/EDR transport.
- The Lower Tester includes one instantiation of the Automation IO Service [6] which includes one instantiation of each of the Digital, Analog and Aggregate characteristics. The Digital, Analog and Aggregate characteristic definitions each contain an associated Client Characteristic Configuration characteristic descriptor and the IUT has executed [AIOP/CL/AIOF/BV-05-C \[Digital Configure Notification\]](#), [AIOP/CL/AIOF/BV-06-C \[Analog Configure Notification\]](#), and/or [AIOP/CL/AIOF/BV-07-C \[Aggregate Configure Notification\]](#) to configure notifications.

- Test Case Configuration

Test Case
<a href="#">AIOP/CL/AIOF/BV-08-C [Digital Receive Notifications]</a>
<a href="#">AIOP/CL/AIOF/BV-09-C [Analog Receive Notifications]</a>
<a href="#">AIOP/CL/AIOF/BV-10-C [Aggregate Receive Notifications]</a>

Table 4-4: Receive Notifications

- Test Procedure

1. The Lower Tester sends an *ATT\_Handle\_Value\_Notification* containing the characteristic value to the IUT.

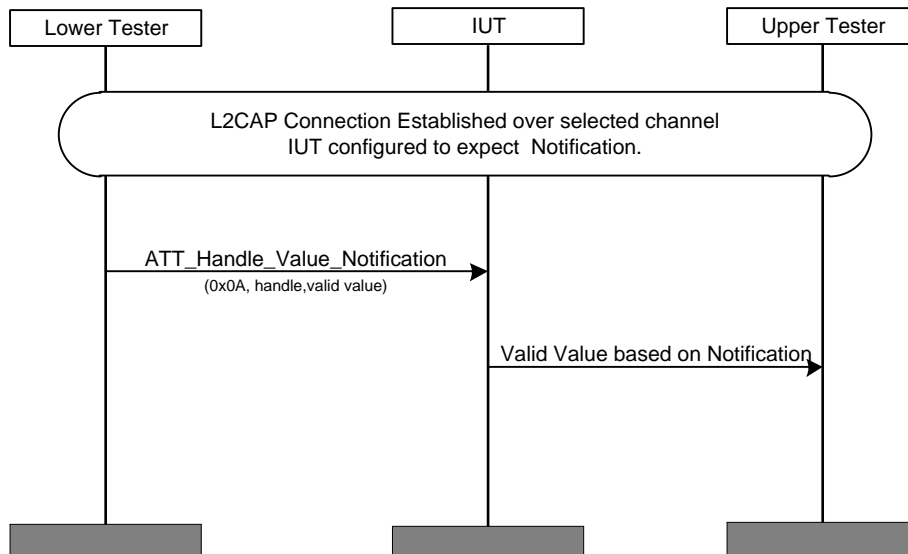


Figure 4-2: Receive Notifications

- Expected Outcome

Pass verdict

The IUT reports the characteristic values received to the Upper Tester.

The characteristic values reported by the IUT match the values sent by the Lower Tester.

#### 4.4.3 Configure for Indication

- Test Purpose

Verify that an Automation IO Client IUT can configure the Digital, Analog or Aggregate characteristic values for indication.

- Reference

[3] 4.4, 4.5, 4.6

- Initial Condition

- Establish an ATT Bearer connection between the Lower Tester and IUT as defined in Section 4.2.1 if using the LE transport or Section 4.2.2 if using the BR/EDR transport.
- The Lower Tester includes one instantiation of the Automation IO Service [6] which includes one instantiation of each of the Digital, Analog and Aggregate characteristics. The Digital, Analog and Aggregate characteristic definitions each contain an associated Client Characteristic Configuration characteristic descriptor.
- The IUT has executed [AIOP/CL/CGGIT/CHA/BV-01-C \[Characteristic GGIT – Digital Characteristic – Notify\]](#), [AIOP/CL/CGGIT/CHA/BV-02-C \[Characteristic GGIT – Analog Characteristic – Notify\]](#), and/or [AIOP/CL/CGGIT/CHA/BV-03-C \[Characteristic GGIT – Aggregate](#)

[Characteristic – Notify](#)] and saved the handle of each Client Characteristic Configuration descriptor.

- Test Case Configuration

Test Case
<a href="#">AIOP/CL/AIOF/BV-11-C [Digital Configure Indication]</a>
<a href="#">AIOP/CL/AIOF/BV-12-C [Analog Configure Indication]</a>
<a href="#">AIOP/CL/AIOF/BV-13-C [Aggregate Configure Indication]</a>

Table 4-5: Configure Indication

- Test Procedure

1. The Upper Tester sends a command to the IUT to configure the characteristic value for indications by writing 0x0002 to the associated Client Characteristic Configuration descriptor.

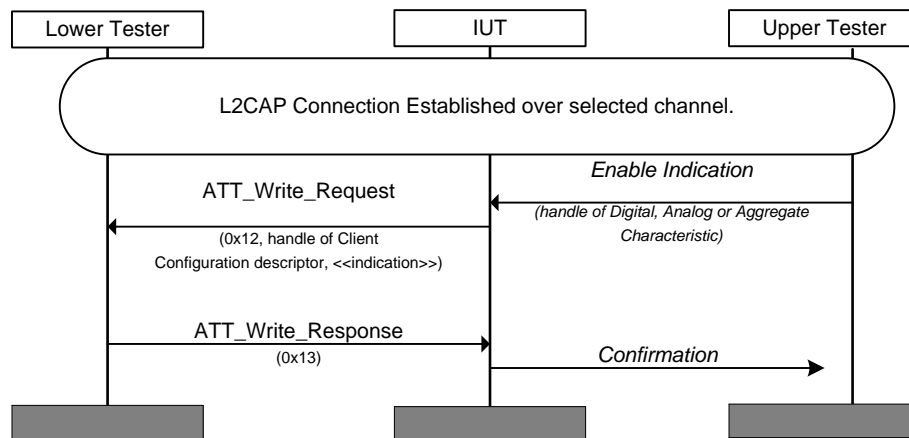


Figure 4-3: Configure for Indication

- Expected Outcome

#### Pass verdict

The IUT sends a correctly formatted *ATT\_Write\_Request* (0x12) to the Lower Tester, with the handle set to that of the associated Client Configuration Descriptor, and the value matches the value requested by the Upper Tester.

### 4.4.4 Receive Indications

- Test Purpose

Verify that an Automation IO Client IUT can receive indications of the Digital, Analog or Aggregate characteristic values.

- Reference

[3] 4.4, 4.5, 4.6

- Initial Condition

- Establish an ATT Bearer connection between the Lower Tester and IUT as defined in Section 4.2.1 if using the LE transport or Section 4.2.2 if using the BR/EDR transport.



- The Lower Tester includes one instantiation of the Automation IO Service [6] which includes one instantiation of each of the Digital, Analog and Aggregate characteristics. The Digital, Analog and Aggregate characteristic definitions each contain an associated Client Characteristic Configuration characteristic descriptor which the IUT has executed [AIOP/CL/AIOF/BV-11-C \[Digital Configure Indication\]](#), [AIOP/CL/AIOF/BV-12-C \[Analog Configure Indication\]](#), and/or [AIOP/CL/AIOF/BV-13-C \[Aggregate Configure Indication\]](#) to configure indications.
- Test Case Configuration

Test Case
<a href="#">AIOP/CL/AIOF/BV-14-C [Digital Receive Indications]</a>
<a href="#">AIOP/CL/AIOF/BV-15-C [Analog Receive Indications]</a>
<a href="#">AIOP/CL/AIOF/BV-16-C [Aggregate Receive Indications]</a>

Table 4-6: Receive Indications

- Test Procedure
  1. The Lower Tester sends an `ATT_Handle_Value_Indication` containing the characteristic value to the IUT.
  2. The IUT reports the received indication of the characteristic value to the Upper Tester
  3. The IUT sends an `ATT_Handle_Value_Confirmation` to the Lower Tester.

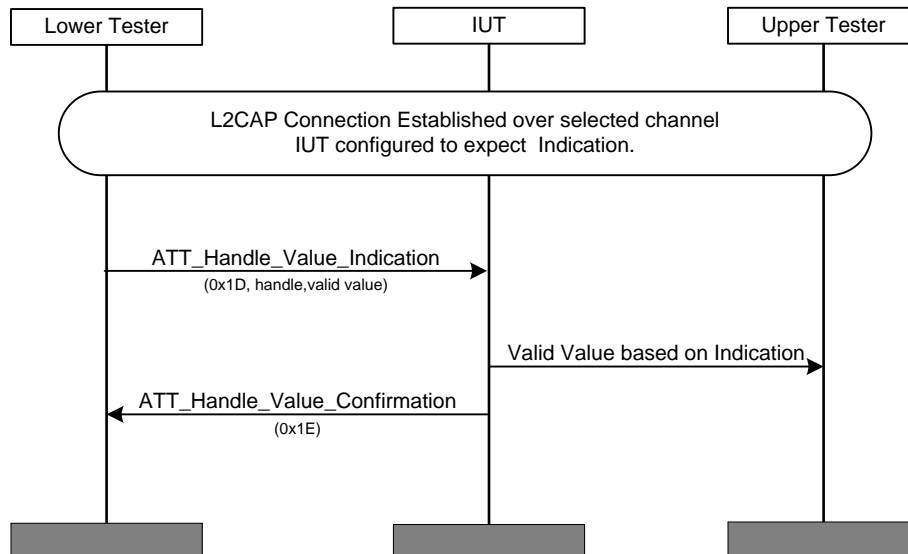


Figure 4-4: Receive Indications

- Expected Outcome

#### Pass verdict

The IUT reports the received indication of the characteristic value to the Upper Tester.

The IUT sends a correctly formatted `ATT_Handle_Value_Confirmation` to the Lower Tester.

The characteristic values reported by the IUT match the values sent by the Lower Tester.

#### 4.4.5 Update Characteristic User Description descriptor

- Test Purpose

Verify that an Automation IO Client IUT can update the Characteristic User Description descriptor of the Digital and Analog characteristics.

- Reference

[3] 4.4, 4.5

- Initial Condition

- Establish an ATT Bearer connection between the Lower Tester and IUT as defined in Section 4.2.1 if using the LE transport or Section 4.2.2 if using the BR/EDR transport.
- The Lower Tester includes one instantiation of the Automation IO Service [6] which includes one instantiation of each of the Digital and Analog characteristics. The Digital and Analog characteristic definitions each contain an associated Client User Description characteristic descriptor.
- The IUT has executed [AIOP/CL/CGGIT/DES/BV-07-C \[Descriptor GGIT – Digital User Description Descriptor\]](#) and [AIOP/CL/CGGIT/DES/BV-08-C \[Descriptor GGIT – Analog User Description Descriptor\]](#) and saved the handle of each Client User Description descriptor.

- Test Case Configuration

Test Case
<a href="#">AIOP/CL/AIOF/BV-17-C [Digital Update Characteristic User Description descriptor]</a>
<a href="#">AIOP/CL/AIOF/BV-18-C [Analog Update Characteristic User Description descriptor]</a>

Table 4-7: Update Characteristic User Description Descriptor

- Test Procedure

- The Upper Tester sends a command to the IUT to write to the associated Characteristic User Description.

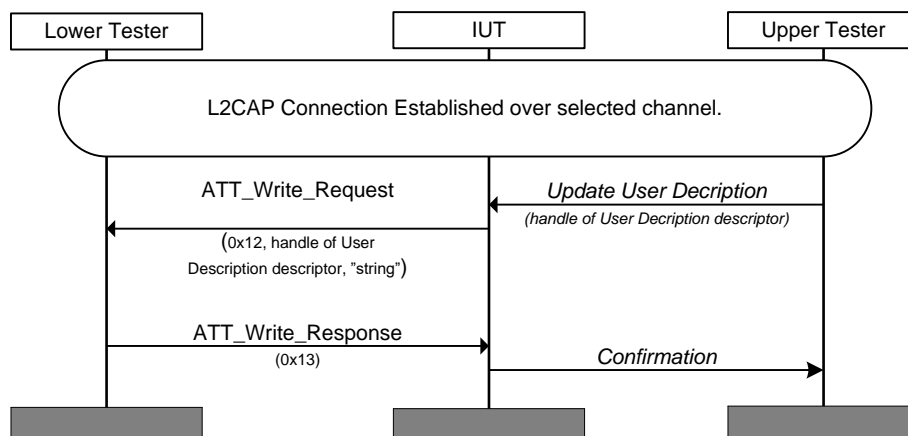


Figure 4-5: Update Characteristic User Description descriptor

- Expected Outcome

Pass verdict

The IUT sends a correctly formatted ATT\_Write\_Request (0x12) to the Lower Tester, with the handle set to that of the associated Characteristic User Description descriptor.

The value requested by the IUT matches the value requested by the Upper Tester.

## 4.5 Lost Bond Procedures

### AIOP/CL/AIOF/BV-25-C [Lost Bond Procedure when using LE Transport]

- Test Purpose

Verify that an Automation IO Client IUT can start encryption with a bonded Automation IO Server upon reconnection.

- Reference

[3] 5.2.2

- Initial Condition

- The IUT and the Lower Tester have previously bonded.
- The IUT has configured the Lower Tester to enable either indications or notifications of supported characteristic values. No connection is established between the IUT and Lower Tester.
- The bond is deleted at the Lower Tester.

- Test Procedure

1. The Lower Tester begins advertising using GAP undirected connectable mode.
2. The IUT establishes a connection to the Lower Tester.
3. The Lower Tester does not send any notifications or indications to the IUT.
4. The IUT starts encryption when the connection is established.
5. The IUT reconfigures the Client Characteristic Configuration descriptor of each supported characteristic for notifications or indications.

- Expected Outcome

Pass verdict

The IUT starts encryption when the connection is reestablished.

The IUT reconfigures the Client Characteristic Configuration descriptors for each supported characteristic by writing a value of 0x0001 or 0x0002 respectively.

The values written to the Client Characteristic Configuration descriptors match the previous values in initial conditions.

**AIOP/CL/AIOF/BV-26-C [Lost Bond Procedure when using BR/EDR transport]**

- Test Purpose

Verify that an Automation IO Client IUT can reconfigure characteristic values on the Automation IO Server for notification or indications if the bond is lost.

- Reference

[\[3\]](#) 5.3.1.2

- Initial Condition

- The IUT and the Lower Tester have previously bonded.
- The IUT has configured the Lower Tester to enable either notifications or indications of supported characteristic values.
- No connection is established between the IUT and Lower Tester.
- The bond is deleted at the Lower Tester.

- Test Procedure

1. The Lower Tester is in connectable mode.
2. The IUT establishes a connection to the Lower Tester.
3. The Lower Tester does not send any notifications to the UT.
4. The IUT starts encryption when the connection is reestablished.
5. The IUT detects the lost bond and reconfigures Client Configuration descriptors in the Lower Tester by writing a value of 0x0001 or 0x0002 respectively.

- Expected Outcome

Pass verdict

The IUT starts encryption when the connection is established.

The IUT reconfigures the Client Characteristic Configuration descriptors for each supported characteristic by writing a value of 0x0001 or 0x0002 respectively.

The values requested by the IUT match the values previously configured in initial conditions.

## 5 Test case mapping

The Test Case Mapping Table (TCMT) maps test cases to specific requirements in the ICS. The IUT is tested in all roles for which support is declared in the ICS document.

The columns for the TCMT are defined as follows:

**Item:** Contains a logical expression based on specific entries from the associated ICS document. Contains a logical expression (using the operators AND, OR, NOT as needed) based on specific entries from the applicable ICS document(s). The entries are in the form of y/x references, where y corresponds to the table number and x corresponds to the feature number as defined in the ICS document for the Automation IO Profile (AIOP) [4].

**Feature:** A brief, informal description of the feature being tested.

**Test Case(s):** The applicable test case identifiers are required for Bluetooth Qualification if the corresponding y/x references defined in the Item column are supported. Further details about the function of the TCMT are elaborated in [1].

For the purpose and structure of the ICS/IXIT, refer to [1].

Item	Feature	Test Case(s)
AIOP 1/2 AND (AIOP 2/2 OR AIOP 2/1) AND AIOP 7/1	Discover Automation IO Service	AIOP/CL/CGGIT/SER/BV-01-C
GATT 1a/4 AND GAP 0/3 AND AIOP 1/1 AND AIOP 2/2 AND NOT AIOP 2/1	Automation IO Service discovery from Server – Invalid transport access over BR/EDR	AIOP/SR/SGGIT/SDPNF/BV-01-C
AIOP 1/2 AND (AIOP 7/2 OR AIOP 7/4 OR AIOP 8/1 OR AIOP 8/2 OR AIOP 8/9 OR AIOP 8/10)	Discover Digital Characteristic – Notify	AIOP/CL/CGGIT/CHA/BV-01-C
AIOP 1/2 AND (AIOP 7/2 OR AIOP 7/4 OR AIOP 8/1 OR AIOP 8/3 OR AIOP 8/9 OR AIOP 8/10)	Discover Digital Characteristic – Indicate	AIOP/CL/CGGIT/CHA/BV-04-C
AIOP 1/2 AND (AIOP 7/10 OR AIOP 7/11 OR AIOP 9/1 OR AIOP 9/2 OR AIOP 9/9 OR AIOP 9/10)	Discover Analog Characteristic – Notify	AIOP/CL/CGGIT/CHA/BV-02-C

Item	Feature	Test Case(s)
AIOP 1/2 AND (AIOP 7/10 OR AIOP 7/11 OR AIOP 9/1 OR AIOP 9/3 OR AIOP 9/9 OR AIOP 9/10)	Discover Analog Characteristic – Indicate	AIOP/CL/CGGIT/CHA/BV-05-C
AIOP 1/2 AND (AIOP 7/17 OR AIOP 7/18 OR AIOP 10/1 OR AIOP 10/2)	Discover Aggregate Characteristic – Notify	AIOP/CL/CGGIT/CHA/BV-03-C
AIOP 1/2 AND (AIOP 7/17 OR AIOP 7/18 OR AIOP 10/1 OR AIOP 10/3)	Discover Aggregate Characteristic – Indicate	AIOP/CL/CGGIT/CHA/BV-06-C
AIOP 1/2 AND (AIOP 7/5 OR AIOP 8/4)	Discover Digital Characteristic: Value Trigger Setting Characteristic Descriptor	AIOP/CL/CGGIT/DES/BV-01-C
AIOP 1/2 AND (AIOP 7/6 OR AIOP 8/5)	Discover Digital Characteristic: Time Trigger Setting Characteristic Descriptor	AIOP/CL/CGGIT/DES/BV-03-C
AIOP 1/2 AND (AIOP 7/12 OR AIOP 9/4)	Discover Analog Characteristic: Value Trigger Setting Characteristic Descriptor	AIOP/CL/CGGIT/DES/BV-02-C
AIOP 1/2 AND (AIOP 7/13 OR AIOP 9/5)	Discover Analog Characteristic: Time Trigger Setting Characteristic Descriptor	AIOP/CL/CGGIT/DES/BV-04-C
AIOP 1/2 AND AIOP 7/7	Discover Digital Characteristic: Presentation Format Characteristic Descriptor	AIOP/CL/CGGIT/DES/BV-05-C
AIOP 1/2 AND AIOP 7/14	Discover Analog Characteristic: Presentation Format Characteristic Descriptor	AIOP/CL/CGGIT/DES/BV-06-C
AIOP 1/2 AND AIOP 7/8	Discover Digital Characteristic: Characteristic User Description Characteristic Descriptor	AIOP/CL/CGGIT/DES/BV-07-C
AIOP 1/2 AND AIOP 7/15	Discover Analog Characteristic: Characteristic User Description Characteristic Descriptor	AIOP/CL/CGGIT/DES/BV-08-C
AIOP 1/2 AND AIOP 7/9	Discover Digital Characteristic: Characteristic Extended Properties Characteristic Descriptor	AIOP/CL/CGGIT/DES/BV-09-C
AIOP 1/2 AND AIOP 7/3	Discover Digital Characteristic: Number of Digitals Characteristic Descriptor	AIOP/CL/CGGIT/DES/BV-11-C
AIOP 1/2 AND AIOP 7/16	Discover Analog Characteristic: Characteristic Extended Properties Characteristic Descriptor	AIOP/CL/CGGIT/DES/BV-10-C

Item	Feature	Test Case(s)
AIOP 1/2 AND AIOP 8/2	Configure Digital Characteristic for notifications: Write to Client Characteristic Configuration Characteristic Descriptor	AIOP/CL/AIOF/BV-05-C
AIOP 1/2 AND AIOP 9/2	Configure Analog Characteristic for notifications: Write to Client Characteristic Configuration Characteristic Descriptor	AIOP/CL/AIOF/BV-06-C
AIOP 1/2 AND AIOP 10/2	Configure Aggregate Characteristic for notifications: Write to Client Characteristic Configuration Characteristic Descriptor	AIOP/CL/AIOF/BV-07-C
AIOP 1/2 AND AIOP 8/6	Receive Digital Characteristic notifications	AIOP/CL/AIOF/BV-08-C
AIOP 1/2 AND AIOP 9/6	Receive Analog Characteristic notifications	AIOP/CL/AIOF/BV-09-C
AIOP 1/2 AND AIOP 10/4	Receive Aggregate Characteristic notifications	AIOP/CL/AIOF/BV-10-C
AIOP 1/2 AND AIOP 8/3	Configure Digital Characteristic for indications: Write to Client Characteristic Configuration Characteristic Descriptor	AIOP/CL/AIOF/BV-11-C
AIOP 1/2 AND AIOP 9/3	Configure Analog Characteristic for indications: Write to Client Characteristic Configuration Characteristic Descriptor	AIOP/CL/AIOF/BV-12-C
AIOP 1/2 AND AIOP 10/3	Configure Aggregate Characteristic for indications: Write to Client Characteristic Configuration Characteristic Descriptor	AIOP/CL/AIOF/BV-13-C
AIOP 1/2 AND AIOP 8/7	Receive Digital Characteristic indications	AIOP/CL/AIOF/BV-14-C
AIOP 1/2 AND AIOP 9/7	Receive Analog Characteristic indications	AIOP/CL/AIOF/BV-15-C
AIOP 1/2 AND AIOP 10/5	Receive Aggregate Characteristic indications	AIOP/CL/AIOF/BV-16-C
AIOP 1/2 AND AIOP 8/8	Digital Characteristic: Write to Characteristic User Description Characteristic Descriptor	AIOP/CL/AIOF/BV-17-C
AIOP 1/2 AND AIOP 9/8	Analog Characteristic: Write to Characteristic User Description Characteristic Descriptor	AIOP/CL/AIOF/BV-18-C
AIOP 1/2 AND AIOP 2/2 AND (AIOP 8/2 OR AIOP 8/3 OR AIOP 9/2 OR AIOP 9/3 OR AIOP 10/2 OR AIOP 10/3)	Lost bond procedure over LE transport	AIOP/CL/AIOF/BV-25-C

Item	Feature	Test Case(s)
AIOP 1/2 AND AIOP 2/1 AND (AIOP 8/2 OR AIOP 8/3 OR AIOP 9/2 OR AIOP 9/3 OR AIOP 10/2 OR AIOP 10/3)	Lost bond procedure over BR/EDR transport	AIOP/CL/AIOF/BV-26-C

*Table 5-1: Test case mapping*



## 6 Revision history and acknowledgments

### Revision History

Publication Number	Revision Number	Date	Comments
0	1.0.0	2015-07-21	Prepared for publication
	1.0.1r00	2016-05-19	Converted to new Test Case ID conventions as defined in TSTO v4.1.
1	1.0.1	2016-07-13	Prepared for TCRL 2016-1 publication.
	1.0.2r00	2018-02-15	TSE 9868 (rating 2): Updated mapping to add GAP 0/3 for AIOP/SR/AIOD/BI-01-I in TCMT.
2	1.0.2	2018-11-21	Approved by BTI. Prepared for TCRL 2018-2 publication.
	p3r00–r04	2023-04-10 – 2023-05-26	<p>TSE 22787 (rating 2): Converted the following test cases to GGIT: AIOP/CL/AIOD/BV-01-I – -03-I, AIOP/CL/AIOD/BV-05-I, AIOP/CL/AIOD/BV-07-I – -16-I, AIOP/CL/AIOD/BV-19-I – -21-I, AIOP/SR/AIOD/BV-01-I, AIOP/CL/AIOF/BV-01-I – -04-I, AIOP/CL/AIOF/BV-21-I – -24-I, and AIOP/CL/AIOF/BV-27-I – -28-I. The new GGIT converted TCIDs are: AIOP/CL/CGGIT/SER/BV-01-C, AIOP/CL/CGGIT/SDPNF/BV-01-C, AIOP/CL/CGGIT/CHA/BV-01-C – -03-C, and AIOP/CL/CGGIT/DES/BV-01-C – -11-C. Updated the TCMT accordingly.</p> <p>TSE 22900 (rating 1): Changed all remaining TCIDs ending with “-I” to “-C” tests, affecting AIOP/CL/AIOF/BV-05-C – -18-C, -25-C, -26-C. Updated TCMT accordingly.</p> <p>Editorials to align the document with the latest TS template and DNMD, including assigning p2 to previous v1.0.2. PTS and consistency checker fixes.</p>
3	p3	2023-06-29	Approved by BTI on 2023-05-28. Prepared for TCRL 2023-1 publication.

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