Audio Input Control Service (AICS)

Bluetooth® Test Suite

- **Revision:** AICS.TS.p1
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Contents

1   Scope

This Bluetooth document contains the Test Suite Structure (TSS) and test cases to test the implementation of the Bluetooth Audio Input Control Service 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]   Bluetooth Core Specification v4.2 or later

[2]   Bluetooth Test Strategy and Terminology Overview

[3]   Audio Input Control Service v1.0

[4]   Audio Input Control Service ICS, AICS.ICS

[5]   GATT Test Suite, GATT.TS

[6]   Characteristic and Descriptor descriptions are accessible via the Bluetooth SIG Assigned Numbers.

[7]   Audio Input Control Service IXIT proforma

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 Audio Input Control Service requires the presence of GAP, SM (when used over LE transport), SDP (when used over BR/EDR transport), L2CAP, and GATT. EATT can optionally be used. This is illustrated in Figure 3.1.
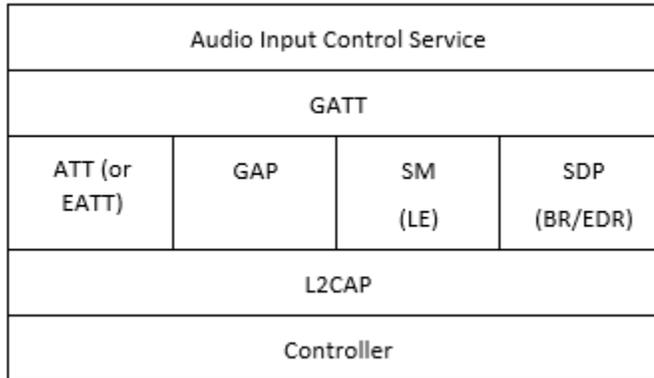
Figure 3.1: Audio Input Control Service Test Model

3.2   Test Strategy

The test objectives are to verify the functionality of the Audio Input Control Service within a Bluetooth Host and to enable interoperability between Bluetooth Hosts on different devices, specifically interoperability between an AICS server and a GATT enabled client. 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. Any defined test herein is applicable to the IUT if the ICS logical expression defined in the Test Case Mapping Table (TCMT) is valid.

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. 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. Additionally, since Audio Input Control Service is a GATT Server based service, Generic GATT Integrated Tests (GGIT) are used to validate parts of the specification. The test coverage is logically grouped in test groups as described below after careful evaluation of requirements defined in the service specification.

3.3   Test groups

The following test groups have been defined:

*   Generic GATT Integrated Tests
    Verify the generic GATT behavior for discovery, characteristics, descriptors, indications, notifications, etc.

*   Audio Input Control Point Procedures
    Verify the behavior of the procedure triggered by writing Opcodes to the Audio Input Control Point.

- Service Procedure – Error Handling
  Verify that the IUT correctly handles error conditions that result from the characteristic writes or failure
  to perform a requested operation due to rejection of the request by a Remote Device.

- Service Procedure – Notification
  Verify that the IUT correctly handles updates of the characteristic and properly sends a Notification.

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 [5] referred to as Generic GATT Integrated Tests (GGIT); when used, the test cases in GGIT are referred through a TCID string using the following convention:
<spec abbreviation>/<IUT role>/<GGIT test group>/< GGIT class >/<xx>-<nn>-<y>.

Identifier Abbreviation	Spec Identifier <spec abbreviation>
AICS	Audio Input Control Service
Identifier Abbreviation	**Role Identifier <IUT role>**
SR	Server
Identifier Abbreviation	**Feature Identifier <feat>**
CP	Control Point
SGGIT	Server Generic GATT Integrated Tests
SPE	Service Procedure – Error handling
SPN	Service Procedure – Notifications

Table 4.1: AICS TC feature naming convention

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 the Bluetooth SIG qualification tool, 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 as information, as they are used by test equipment in achieving the initial conditions in certain tests.

4.2.1 ATT Bearer on LE Transport

Preamble procedure:

1. Establish an LE transport connection between the IUT and the Lower Tester.

2. Establish an L2CAP channel 0x0004 between the IUT and the Lower Tester over that LE transport.

4.2.2 ATT Bearer on BR/EDR Transport

Preamble procedure:

1. Establish a BR/EDR transport connection between the IUT and the Lower Tester.

2. Establish an L2CAP channel (PSM 0x001F) between the IUT and the Lower Tester over that BR/EDR transport.

4.2.3 EATT Bearer on LE Transport

Preamble procedure:

1. Establish an LE transport connection between the IUT and the Lower Tester.

2. Establish an L2CAP channel 0x0005 for signaling and one L2CAP channel (for ATT bearers) with EATT PSM (as defined in Assigned Numbers) between the IUT and the Lower Tester over that LE transport.

4.2.4　　EATT Bearer on BR/EDR Transport

Preamble procedure:

1. Establish a BR/EDR transport connection between the IUT and the Lower Tester.

2. Establish an L2CAP channel 0x0001 for signaling and one L2CAP channel (for ATT bearers) with EATT PSM (as defined in Assigned Numbers) between the IUT and the Lower Tester over that BR/EDR transport.

4.2.5　　Audio Input Control Point

Preamble procedure:

1. Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using ATT over an LE transport, or 4.2.2 if using ATT over a BR/EDR transport, or 4.2.3 if using EATT over an LE transport, or 4.2.4 if using EATT over a BR/EDR transport.

2. The handle of the Audio Input Control Point characteristic has been previously discovered by the Lower Tester during a test procedure in Section 4.3 or is known to the Lower Tester by other means.

3. The handle of the Client Configuration descriptor of the Audio Input Control Point characteristic has been previously discovered by the Lower Tester during a test procedure in Section 4.3 or is known to the Lower Tester by other means.

4. If the IUT requires bonding, then the Lower Tester performs a bonding procedure.

4.3   Generic GATT Integration Tests

Execute the Generic GATT Integrated Tests defined in Section 6.3 of [5] Server Test Procedures using Table 4.2 below as input:

Test Cases	Service / Characteristic / Descriptor	Reference	Properties	Value Length (Octets)
AICS/SR/SGGIT/SER/BV-01-C [Service GGIT – Audio Input]	Audio Input Control Service	[3] 2.1	-	-
AICS/SR/SGGIT/SDP/BV-01-C [SDP GGIT – Audio Input Control Service]	Audio Input Control Service	[3] 4	-	-
AICS/SR/SGGIT/CHA/BV-01-C [Characteristic GGIT – Audio Input State]	Audio Input State Characteristic	[3] 3.1	0x12 (Read, Notify)	4
AICS/SR/SGGIT/CHA/BV-02-C [Characteristic GGIT – Gain Setting Properties]	Gain Setting Properties Characteristic	[3] 3.2	0x02 (Read)	3
AICS/SR/SGGIT/CHA/BV-03-C [Characteristic GGIT – Audio Input Type]	Audio Input Type Characteristic	[3] 3.3	0x02 (Read)	1
AICS/SR/SGGIT/CHA/BV-04-C [Characteristic GGIT – Audio Input Status]	Audio Input Status Characteristic	[3] 3.4	0x12 (Read, Notify)	1
AICS/SR/SGGIT/CHA/BV-05-C [Characteristic GGIT – Audio Input Control Point]	Audio Input Control Point Characteristic	[3] 3.5	0x08 (Write)	Skip
AICS/SR/SGGIT/CHA/BV-06-C [Characteristic GGIT – Audio Input Description]	Audio Input Description Characteristic	[3] 3.6	Mandatory:0x12 (Read, Notify) Optional: 0x04 (WriteWithoutResponse)	Skip

Table 4.2: Input for the GGIT Server Test Procedure

4.4   Audio Input Control Point Procedures

Test group to test Audio Input Control Point procedures.

AICS/SR/CP/BV-01-C [Audio Input Control Point - Set Gain Setting]

- Test Purpose

  Verify that an AICS Server IUT responds to the Set Gain Setting Opcode and updates its Audio Input State characteristic.

- Reference

  [3] 3.5.2.1

- Initial Condition

  - Enable the IUT for use with the Audio Input Control Point by performing the preamble described in Section 4.2.5

  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Audio Input State CCCD.

  - The Upper Tester sets the Change_Counter field of the Audio Input State characteristic to 254, if the IUT supports the setting of the Change_Counter.

- Test Procedure

  1. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Audio Input State characteristic.
  2. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Gain Setting Properties characteristic.

     Repeat Steps 3–5 for (255 – Change_Counter value) + 1 times.

  3. The Lower Tester executes the GATT Write Characteristic Value sub-procedure for the Audio Input Control Point characteristic with the Set Gain Setting Opcode, Gain Setting parameter set to a random value between the Gain_Setting_Minimum field and Gain_Setting_Maximum field values and different than the last iteration, and the Change_Counter parameter.
  4. The Lower Tester receives a Write Response indicating that the IUT has accepted the Opcode.
  5. The Lower Tester receives a GATT Characteristic Value Notification for the Audio Input State characteristic.

- Expected Outcome

  Pass verdict

  The IUT sends notifications of the Audio Input State characteristic with the Gain Setting field corresponding to the value written by the Lower Tester and with Mute value unchanged.

  The Change_Counter field increments and rolls over to zero.

  The Gain_Setting_Minimum field is less than or equal to the Gain_Setting_Maximum field in Step 2.

AICS/SR/CP/BV-02-C [Audio Input Control Point - Unmute]

- Test Purpose

  Verify that an AICS Server IUT responds to the Unmute procedure and updates its Audio Input State characteristic

- Reference

  [3] 3.5.2.2

- Initial Condition

  - Enable the IUT for use with the Audio Input Control Point by performing the preamble described in Section 4.2.5.

  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Audio Input State CCCD.

  - The IUT has set its Mute value to Muted.

- Test Procedure

  1. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Audio Input State characteristic.
  2. The Lower Tester executes the GATT Write Characteristic Value sub-procedure for the Audio Input Control Point characteristic with the Unmute Opcode and the Change_Counter parameter.
  3. The Lower Tester receives a Write Response indicating that the IUT has accepted the Opcode.
  4. The Lower Tester receives a GATT Characteristic Value Notification for the Audio Input State characteristic.

- Expected Outcome

  <u>Pass verdict</u>

  The IUT sends one notification of the Audio Input State characteristic.

  The Gain Setting value is not changed.

  The Mute value is set to Unmuted.

AICS/SR/CP/BV-03-C [Audio Input Control Point - Mute]

- Test Purpose

  Verify that an AICS Server IUT responds to the Mute Opcode and updates its Audio Input State characteristic.

- Reference

  [3] 3.5.2.3

- Initial Condition

  - Enable the IUT for use with the Audio Input Control Point by performing the preamble described in Section 4.2.5.

  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Audio Input State CCCD.

  - The IUT has set its Mute value to Unmuted.

- Test Procedure

  1. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Audio Input State characteristic.
  2. The Lower Tester executes the GATT Write Characteristic Value sub-procedure for the Audio Input Control Point characteristic with the Mute Opcode and the Change_Counter parameter.

    3.   The Lower Tester receives a Write Response indicating that the IUT has accepted the Opcode.

    4.   The Lower Tester receives a GATT Characteristic Value Notification for the Audio Input State characteristic.

- Expected Outcome

  <u>Pass verdict</u>

  The IUT sends one notification of the Audio Input State characteristic.

  The Gain Setting value is not changed.

  The Mute value is set to Muted.

AICS/SR/CP/BV-04-C [Audio Input Control Point - Set Manual Gain Mode]

- Test Purpose

  Verify that an AICS Server IUT responds to the Set Manual Gain Mode Setting Opcode and updates its Audio Input State characteristic.

- Reference

  [3] 3.5.2.4

- Initial Condition

  - Enable the IUT for use with the Audio Input Control Point by performing the preamble described in Section 4.2.5.

  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Audio Input State CCCD.

  - The IUT has set its Gain_Mode field value to Automatic.

- Test Procedure

  1. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Audio Input State characteristic.
  2. The Lower Tester executes the GATT Write Characteristic Value sub-procedure for the Audio Input Control Point characteristic with the Set Manual Gain Mode Opcode and the Change_Counter parameter.
  3. The Lower Tester receives a Write Response indicating that the IUT has accepted the Opcode.
  4. The Lower Tester receives a GATT Characteristic Value Notification for the Audio Input State characteristic.

- Expected Outcome

  <u>Pass verdict</u>

  The IUT sends one notification of the Audio Input State characteristic.

  The Gain_Mode field value is set to Manual.

AICS/SR/CP/BV-05-C [Audio Input Control Point - Set Automatic Gain Mode]

- Test Purpose

  Verify that an AICS Server IUT responds to the Set Automatic Gain Mode Setting Opcode and updates its Audio Input State characteristic.

- Reference

  [3] 3.5.2.5

- Initial Condition

    - Enable the IUT for use with the Audio Input Control Point by performing the preamble described in Section 4.2.5.

    - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Audio Input State CCCD.

    - The IUT has set its Gain_Mode field value to Manual.

- Test Procedure

    1. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Audio Input State characteristic.
    2. The Lower Tester executes the GATT Write Characteristic Value sub-procedure for the Audio Input Control Point characteristic with the Set Automatic Gain Mode Opcode and the Change_Counter parameter.
    3. The Lower Tester receives a Write Response indicating that the IUT has accepted the Opcode.
    4. The Lower Tester receives a GATT Characteristic Value Notification for the Audio Input State characteristic.

- Expected Outcome

  Pass verdict

  The IUT sends one notification of the Audio Input State characteristic.

  The Gain_Mode field value is set to Automatic.

4.5   Service Procedure - Notifications

4.5.1   Update Audio Input Description Characteristic

- Test Purpose

  This test group contains one or more test cases to verify the behavior of the IUT when it updates its characteristics while a Client is connected.

- Reference

  [3] 3.6.1

- Initial Condition

    - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1, if using ATT over an LE transport, or 4.2.2 if using ATT over a BR/EDR transport, or 4.2.3 if using EATT over an LE transport, or 4.2.4 if using EATT over a BR/EDR transport.

    - The Lower Tester has cached the AICS service and characteristics handles (e.g., by running the procedures in Section 4.3).

    - The Lower Tester enables notification for the Audio Input Description characteristic by writing the value 0x0001 to the Audio Input Description CCCD using the GATT Write Characteristic Descriptor sub-procedure.

- Test Configuration

TCID	Step
AICS/SR/SPN/BV-01-C [Update Audio Input Description Characteristic]	The Lower Tester executes the GATT Write Without Response Characteristic Value sub-procedure with a different value than received in Step 1.
AICS/SR/SPN/BV-02-C [Autonomously Update Audio Input Description Characteristic]	The Upper Tester orders the IUT to change the value of the Audio Input Description characteristic that is different from the value received in Step 1.

Table 4.3: Update Audio Input Description Characteristics Test Cases

- Test Procedure

  1. The Lower Tester reads the characteristic value for the Audio Input Description characteristic by executing the GATT Read Characteristic Value sub-procedure.
  2. The Lower Tester or Upper Tester executes the step specified in Table 4.3.
  3. The IUT sends a notification containing the updated value of the Audio Input Description characteristic

- Expected Outcome

  Pass verdict

  In Step 3, the characteristic value is correctly formatted, and is different from the one received in Step 1.

4.6   Service Procedure Error Handling

Test Cases	Control Point Characteristic	Reference	TC Configuration	Parameter(s)	Pass Verdict
AICS/SR/SGGIT/CP/BI-01-C [Invalid Change Counter]	Audio Input Control Point Characteristic	[3] 3.5.2	The Lower Tester knows the current Change_Counter or executes the GATT Read Characteristic Value sub-procedure for the Audio Input State characteristic. Test Procedure run in rounds. 1: Opcode = Set Gain Setting 2: Opcode = Unmute 3: Opcode = Mute 4: Opcode = Set Manual Gain Mode 5: Opcode = Set Automatic Gain Mode	Change_Counter <> current	Invalid Change Counter (0x80)
AICS/SR/SGGIT/CP/BI-02-C [Op Code Not Supported]	Audio Input Control Point Characteristic	[3] 1.6		Opcode = 0x06 (RFU)	Opcode Not Supported (0x81)
AICS/SR/SGGIT/CP/BI-03-C [Mute Disabled]	Audio Input Control Point Characteristic	[3] 3.5.2.2, 3.5.2.3	The IUT has its Mute disabled. The Lower Tester knows the current Change_Counter or executes the GATT Read Characteristic Value sub-procedure for the Audio Input State characteristic. Test Procedure run in rounds. 1: Opcode = Unmute 2: Opcode = Mute	Change_Counter = current Change_Counter value	Mute Disabled (0x82)

Test Cases	Control Point Characteristic	Reference	TC Configuration	Parameter(s)	Pass Verdict
AICS/SR/SGGIT/CP/BI-04-C [Gain Mode Change Not Allowed – Automatic Only]	Audio Input Control Point Characteristic	[3] 3.5.2.4	The Upper Tester sets the Gain_Mode as specified in each round. The Lower Tester knows the current Change_Counter or executes the GATT Read Characteristic Value sub-procedure for the Audio Input State characteristic. Test Procedure run in rounds. 1: Gain_Mode = "Automatic Only", Opcode = Set Manual Gain Mode 2: Gain_Mode = "Automatic Only", Opcode = Set Automatic Gain Mode	Change_Counter = current Change_Counter value	Gain Mode Change Not Allowed (0x84)
AICS/SR/SGGIT/CP/BI-05-C [Gain Mode Change Not Allowed – Manual Only]	Audio Input Control Point Characteristic	[3] 3.5.2.4	The Upper Tester set the Gain_Mode as specified in each round. The Lower Tester knows the current Change_Counter or executes the GATT Read Characteristic Value sub-procedure for the Audio Input State characteristic. Test Procedure run in Rounds. 1: Gain_Mode = "Manual Only", Opcode = Set Manual Gain Mode 2: Gain_Mode = "Manual Only", Opcode = Set Automatic Gain Mode	Change_Counter = current Change_Counter value	Gain Mode Change Not Allowed (0x84)

Table 4.4: Service Procedure Error Handling Generic Test Cases

AICS/SR/SPE/BI-01-C [Audio Input Control Point - Value Out of Range]

- Test Purpose

  Verify that an AICS Server IUT returns a Value Out of Range error when the Set Gain Setting procedure is called with an invalid parameter.

- Reference

  [3] 3.5.2.1

- Initial Condition

  - Enable the IUT for use with the Audio Input Control Point by performing the preamble described in Section 4.2.5.

  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Audio Input State CCCD.

- Test Procedure

  1. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Audio Input State characteristic.
  2. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Gain_Setting Properties characteristic.
  3. Perform Alternative 3A, 3B, 3C, or 3D depending on the Gain_Setting_Maximum and Gain_Setting_Minimum fields.

     Alternative 3A (IUT Gain_Setting_Maximum and Gain_Setting_Minimum fields are not set to both the int8 max (127) and the int8 min (-128), respectively):

     3A.1. The Lower Tester executes the GATT Write Characteristic Value sub-procedure for the Audio Input Control Point characteristic with the Set Gain Setting Opcode, Gain_Setting parameters set to a random value greater than the Gain_Setting_Maximum field, and the Change_Counter parameter set to the Change_Counter field.
     3A.2. The Lower Tester receives an error response with an error code from the IUT.
     3A.3. The Lower Tester executes the GATT Write Characteristic Value sub-procedure for the Audio Input Control Point characteristic with the Set Gain Setting Opcode, Gain_Setting parameters set to a random value less than the Gain_Setting_Minimum field, and the Change_Counter parameter set to the Change_Counter field.
     3A.4. The Lower Tester receives an error response with an error code from the IUT.

     Alternative 3B (IUT Gain_Setting_Maximum field is set to the int8 max (127) and the Gain_Setting_Minimum field is not set to the int8 min (-128)):

     3B.1. The Lower Tester executes the GATT Write Characteristic Value sub-procedure for the Audio Input Control Point characteristic with the Set Gain Setting Opcode, Gain_Setting parameters set to a random value less than the Gain_Setting_Minimum field, and the Change_Counter parameter set to the Change_Counter field.
     3B.2. The Lower Tester receives an error response with an error code from the IUT.

Alternative 3C (IUT Gain_Setting_Minimum field is set to the int8 min (-128), and the Gain_Setting_Maximum field is not set to the int8 max (127)):

3C.1. The Lower Tester executes the GATT Write Characteristic Value sub-procedure for the Audio Input Control Point characteristic with the Set Gain Setting Opcode, Gain_Setting parameters set to a random value greater than the Gain_Setting_Maximum field, and the Change_Counter parameter set to the Change_Counter field.

3C.2. The Lower Tester receives an error response with an error code from the IUT.

Alternative 3D (IUT Gain_Setting_Maximum field is set to int8 max (127), and the Gain_Setting_Minimum field is set to the int8 min (-128)):

3D.1. The Lower Tester executes the GATT Write Characteristic Value sub-procedure for the Audio Input Control Point characteristic with the Set Gain Setting Opcode, Gain_Setting parameters set to the int8 max (128), and the Change_Counter parameter set to the Change_Counter field.

3D.2. The Lower Tester does not receive an error response from the IUT. The action is successful.

3D.3. The Lower Tester executes the GATT Write Characteristic Value sub-procedure for the Audio Input Control Point characteristic with the Set Gain Setting Opcode, Gain_Setting parameters set to the int8 min (-127), and the Change_Counter parameter set to the Change_Counter field.

3D.4. The Lower Tester does not receive an error response from the IUT. The action is successful.

- Expected Outcome

Pass verdict

In Steps 3A.2,3A.4, 3B.2, and 3C.2, the IUT sends an error response of "Value Out of Range" to the Lower Tester after both writes.

In Steps 3D.2 and 3D.4, the IUT does not send an error response of "Value Out of Range" to the Lower Tester after the successful Write Characteristic Value sub-procedure in Steps 3D.1 and 3D.3.

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 Audio Input Control Service [4].

If a test case is mandatory within the respective layer, then the y/x reference is omitted.

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 [2].

For the purpose and structure of the ICS/IXIT, refer to [2].

Item	Feature	Test Case(s)
AICS 1/1	Service Supported over BR/EDR	AICS/SR/SGGIT/SDP/BV-01-C
AICS 1/1 OR AICS 1/2	Audio Input Control Service	AICS/SR/SGGIT/SER/BV-01-C
AICS 2/1	Audio Input State Characteristic	AICS/SR/SGGIT/CHA/BV-01-C
AICS 2/2	Gain Setting Properties Characteristic	AICS/SR/SGGIT/CHA/BV-02-C
AICS 2/3	Audio Input Type Characteristic	AICS/SR/SGGIT/CHA/BV-03-C
AICS 2/4	Audio Input Status Characteristic	AICS/SR/SGGIT/CHA/BV-04-C
AICS 2/5	Audio Input Control Point Characteristic	AICS/SR/CP/BV-01-C AICS/SR/CP/BV-02-C AICS/SR/CP/BV-03-C AICS/SR/CP/BV-04-C AICS/SR/CP/BV-05-C AICS/SR/SGGIT/CHA/BV-05-C AICS/SR/SGGIT/CP/BI-01-C AICS/SR/SGGIT/CP/BI-02-C AICS/SR/SPE/BI-01-C
AICS 2/5 AND AICS 2/10	Autonomous Manual Only	AICS/SR/SGGIT/CP/BI-05-C
AICS 2/5 AND AICS 2/9	Autonomous Automatic Only	AICS/SR/SGGIT/CP/BI-04-C
AICS 2/5 AND AICS 3/3b	Audio Input Control Point Characteristic – Mute Disabled	AICS/SR/SGGIT/CP/BI-03-C
AICS 2/6	Audio Input Description Characteristic	AICS/SR/SGGIT/CHA/BV-06-C

Item	Feature	Test Case(s)
AICS 2/7	Autonomous Audio Input Description Characteristic Update	AICS/SR/SPN/BV-02-C
AICS 2/7 AND AICS 2/8	Writable and Notifiable Audio Input Description Characteristic	AICS/SR/SPN/BV-01-C

Table 5.1: Test case mapping

6   Revision history and acknowledgments

Revision History

Publication Number	Revision Number	Date	Comments
0	p0	2020-12-22	Approved by BTI on 2020-11-29. AICS v1.0 adopted by the BoD on 2020-12-15. Prepared for publication.
	p1r00	2024-11-18	TSE 25929 (rating 2): Per E26031, changed the TCMT entry for AICS/SR/SGGIT/CP/BI-03-C. TSE 25983 (rating 4): Per E26032, modified AICS/SR/SGGIT/CP/BI-04-C, added AICS/SR/SGGIT/CP/BI-05-C, and updated the associated TCMT entries.
1	p1	2025-02-18	Approved by BTI on 2025-02-09. AICS v1.0.1 adopted by the BoD on 2024-02-11. Prepared for TCRL 2025-1 publication.

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Name	Company
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