Microphone Control Profile (MICP)

Bluetooth® Test Suite

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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 Microphone Control Profile 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.

[1]   Bluetooth Core Specification, Version 5.2 or later

[2]   Test Strategy and Terminology Overview

[3]   Microphone Control Profile, Version 1.0

[4]   Microphone Control Service, Version 1.0

[5]   Microphone Control Profile ICS, MICP.ICS

[6]   GATT Test Suite, GATT.TS

[7]   Audio Input Control Service, Version 1.0

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 Microphone Control Profile [3] requires the presence of GAP, SM (when used over LE transport), SDP (when used over BR/EDR transport), and GATT. This is illustrated in Figure 3.1.

Microphone Controller Role			
GATT			
ATT (or EATT)	GAP	SM (LE)	SDP (BR/EDR)
L2CAP			
Controller			

Microphone Device Role			
Microphone Control Service		Audio Input Control Service	
GATT			
ATT (or EATT)	GAP	SM (LE)	SDP (BR/EDR)
L2CAP			
Controller			
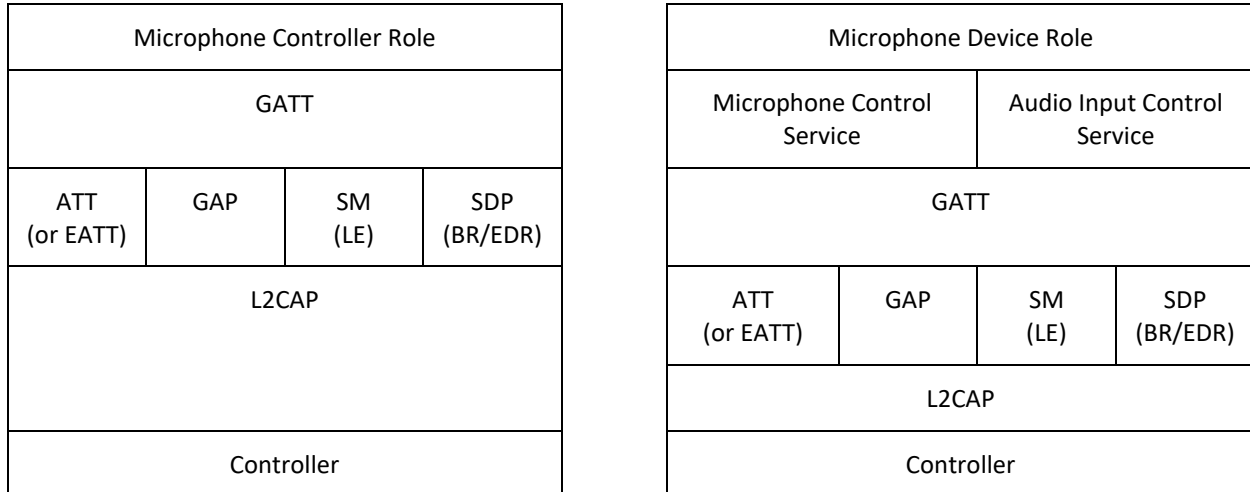
Figure 3.1: Microphone Control Profile test model

3.2 Test Strategy

The test objectives are to verify functionality of the Microphone Control Profile within a Bluetooth Host and enable interoperability between Bluetooth Hosts on different devices, specifically those that are conforming to the Microphone Controller and Microphone Device roles. The testing approach covers mandatory and optional requirements in the specifications 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) 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. Additionally, since the Microphone Control Profile is a GATT-based profile, Generic GATT Integrated Tests (GGIT) are used to validate parts of the specification. 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.

The MICP testing focuses on ensuring that an IUT as a Microphone Controller can properly perform all the procedures and interactions that are required to control one or more microphones. This includes proper handling of all mandatory features of the Microphone Control Profile, such as advertising, discovery, GATT services, and the Audio Input Control Point procedures.

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 a 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.

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 [6] 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 Identifier <spec abbreviation>
MICP	Microphone Control Profile
Identifier Abbreviation	**Role Identifier <IUT role>**
CL	Client – associated with the Microphone Controller role
SR	Server – associated with the Microphone Device role
Identifier Abbreviation	**Feature Identifier <feat>**
CGGIT	Client Generic GATT Integrated Tests
CP	Audio Input Control Point
DSC	Discovery and Advertising
SGGIT	Server Generic GATT Integrated Tests
SPE	Service Procedure – Error handling
Identifier Abbreviation	**Function Identifier <func>**
CHA	Characteristic GGIT
SDPNF	SDP GGIT
SER	Service GGIT

Table 4.1: MICP 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, 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 ATT Bearer on LE Transport with Extended Advertising

Preamble procedure:

1. Establish an LE transport connection between the IUT and the Lower Tester, where the advertising implementation (as GAP Peripheral) uses Extended Advertising as defined in Section 6.1.1 of [3] and the discovering implementation (as GAP Central) operates according to Section 6.1.2 of [3].
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 with Extended Advertising

Preamble procedure:

1. Establish an LE transport connection between the IUT and the Lower Tester, where the advertising implementation (as GAP Peripheral) uses Extended Advertising as defined in Section 6.1.1 of [3] and the discovering implementation (as GAP Central) operates according to Section 6.1.2 of [3].
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.

4.3   Generic GATT Integration Tests

Execute the Generic GATT Integrated Tests defined in Section 6.3, Server test procedures (SGGIT), and Section 6.4, Client test procedures (CGGIT), in [6] using Table 4.2 below as input:

TCID	Service / Characteristic / Descriptor	Reference	Properties	Value Length (Octets)	Related to Primary Service
MICP/CL/CGGIT/SER/BV-01-C [Service GGIT – Microphone Control]	Microphone Control Service	[3] 4.3.1	-	-	-
MICP/CL/CGGIT/CHA/BV-01-C [Characteristic GGIT – Mute]	Mute Characteristic	[3] 4.3.1	0x1A (Read, Write, Notify)	1	-
MICP/SR/SGGIT/SDPNF/BV-01-C [Not discoverable over BR/EDR – Microphone Control Service]	Microphone Control Service	[3] 4.2	-	-	-
Audio Input Control Service					
MICP/CL/CGGIT/SER/BV-02-C [Service GGIT – Audio Input Control]	Audio Input Control Service	[3] 4.3.2	-	-	MICS
MICP/CL/CGGIT/CHA/BV-02-C [Characteristic GGIT – Audio Input State]	Audio Input State Characteristic	[3] 4.3.2	0x12 (Read, Notify)	4	-
MICP/CL/CGGIT/CHA/BV-03-C [Characteristic GGIT – Gain Setting Properties]	Gain Setting Properties Characteristic	[3] 4.3.2	0x02 (Read)	3	-
MICP/CL/CGGIT/CHA/BV-04-C [Characteristic GGIT – Audio Input Type]	Audio Input Type Characteristic	[3] 4.3.2	0x02 (Read)	1	-
MICP/CL/CGGIT/CHA/BV-05-C [Characteristic GGIT – Audio Input Status]	Audio Input Status Characteristic	[3] 4.3.2	0x12 (Read, Notify)	1	-
MICP/CL/CGGIT/CHA/BV-06-C [Characteristic GGIT – Audio Input Control Point]	Audio Input Control Point Characteristic	[3] 4.3.2	0x08 (Write)	skip	-

TCID	Service / Characteristic / Descriptor	Reference	Properties	Value Length (Octets)	Related to Primary Service
MICP/CL/CGGIT/CHA/BV-07-C [Characteristic GGIT – Audio Input Description]	Audio Input Description Characteristic	[3] 4.3.2	Mandatory:0x12 (Read, Notify) Optional: 0x04 (WriteWithoutResponse)	skip	-
MICP/SR/SGGIT/SDPNF/BV-02-C [Not discoverable over BR/EDR – Audio Input Control Service]	Audio Input Control Service	[3] 4.2	-	-	-

Table 4.2: Input for the GGIT Server and Client test procedures

4.4   Device Discovery

4.4.1   LE Audio Major Service Class CoD Support

- Test Purpose

  Verify that the IUT implementing either the Microphone Device or Microphone Controller roles that supports the BR/EDR transport sets the LE Audio Major Service Class in the Class of Device field.

- Reference

  [3] 6.2.3

- Initial Condition

  - The IUT is discoverable and connectable over the BR/EDR transport.

- Test Case Configuration

Test Case
MICP/CL/DSC/BV-01-C [Microphone Controller – LE Audio Major Service Class CoD Support]
MICP/SR/DSC/BV-01-C [Microphone Device – LE Audio Major Service Class CoD Support]

  Table 4.3: LE Audio Major Service Class CoD Support test cases

- Test Procedure

  1. The Lower Tester performs the Inquiry procedure.
  2. The IUT sends an Inquiry response message.

- Expected Outcome

  Pass verdict

  In step 2, the Class of Device field has the LE Audio Major Service Class bit set to 1.

  If the IUT uses limited discoverable mode, the limited discoverable Major Service Class bit is also set to 1.

4.5   Service Procedure – Audio Input Control Point

- Test Purpose

  This is a generic procedure to test multiple procedures for writing opcodes to the Audio Input Control Point and verifying the response. It is repeated for each row of Table 4.4.

- Reference

  [3] 4.5.7

- Initial Condition

  - Establish a 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 includes an instantiation of the Audio Input Control Service.

  - The IUT has discovered the Audio Input Control Service and has saved the handle range.

- Test Case Configuration

Test Case	Procedure
MICP/CL/CP/BV-01-C [Audio Input Control Point – Set Gain Setting]	Set Gain Setting
MICP/CL/CP/BV-02-C [Audio Input Control Point – Unmute]	Unmute
MICP/CL/CP/BV-03-C [Audio Input Control Point – Mute]	Mute
MICP/CL/CP/BV-04-C [Audio Input Control Point – Set Manual Gain Mode]	Set Manual Gain Mode
MICP/CL/CP/BV-05-C [Audio Input Control Point – Set Automatic Gain Mode]	Set Automatic Gain Mode

Table 4.4: Audio Input Control Point Procedures test cases

- Test Procedure

1. The Upper Tester orders the IUT to execute the Procedure specified in Table 4.4.
2. The Lower Tester sends the IUT a response indicating that the Procedure is successful.

- Expected Outcome

Pass verdict

The IUT successfully calls the specified Procedure with the correct parameter values.

4.6 Service Procedure – Error Handling

MICP/CL/SPE/BI-01-C [Microphone Control Service – Error Codes]

- Test Purpose

Verify that the IUT operation is uninterrupted when it receives the Application Error Code "Mute Disabled" from the Mute Characteristic in response to a Write Request.

- Reference

[3] 4.4.3

[7] 3.5.2.3

- Initial Condition

- Establish a 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.

- Test Procedure

Execute steps 1–3 for each round in Table 4.5.

1. The Upper Tester orders the IUT to execute the Set Mute sub-procedure with any value.
2. The Lower Tester responds with an Error Response with the Error Code specified in Table 4.5.
3. The Upper Tester orders the IUT to execute the Read Mute sub-procedure.

Round	Error Code
1	0x80 (Mute Disabled)

Table 4.5: MICP/CL/SPE/BI-01-C [Microphone Control Service – Error Codes] rounds

- Expected Outcome

Pass verdict

The IUT successfully executes the Read Mute sub-procedure after having received the error code.

4.6.1 Audio Input Control Point – Invalid Change Counter

- Test Purpose

Verify that the IUT operation is uninterrupted when it receives the Application Error Code "Invalid Change Counter" from the Audio Input Control Point in response to a Write Request.

- Reference

[3] 4.5.7

[7] 3.5.2

- Initial Condition

  - Establish a 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 includes one instantiation of the Audio Input Control Service.

  - The IUT has enabled notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure to the Audio Input State Client Characteristic Configuration descriptor.

- Test Case Configuration

Test Case	Procedure
MICP/CL/SPE/BI-02-C [AICP – Invalid Change Counter – Set Gain Setting]	Set Gain Setting
MICP/CL/SPE/BI-03-C [AICP – Invalid Change Counter – Unmute]	Unmute
MICP/CL/SPE/BI-04-C [AICP – Invalid Change Counter – Mute]	Mute
MICP/CL/SPE/BI-05-C [AICP – Invalid Change Counter – Set Manual Gain Mode]	Set Manual Gain Mode
MICP/CL/SPE/BI-06-C [AICP – Invalid Change Counter – Set Automatic Gain Mode]	Set Automatic Gain Mode

Table 4.6: Input for Invalid Change Counter test procedure

- Test Procedure

  1. The Upper Tester orders the IUT to execute the Procedure specified in Table 4.6.
  2. The Lower Tester responds with an Error Response where the error code is 0x80 (Invalid Change Counter).
  3. The Upper Tester orders the IUT to execute any sub-procedure that reads a characteristic.

- Expected Outcome

Pass verdict

The IUT successfully executes a GATT Read Characteristic Value sub-procedure after having received the error code.

MICP/CL/SPE/BI-07-C [Audio Input Control Point – Value Out of Range]

- Test Purpose

  Verify that the IUT operation is uninterrupted when it receives the Application Error Code "Value Out of Range" from the Audio Input Control Point in response to a Set Gain Setting procedure call.

- Reference

  [3] 4.5.7.1

  [7] 3.5.2.1

- Initial Condition

  - Establish a 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 includes one instantiation of the Audio Input Control Service.

  - The IUT has enabled notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure to the Audio Input State Client Characteristic Configuration descriptor.

- Test Procedure

  1. The Upper Tester orders the IUT to execute the Set Gain Setting sub-procedure.
  2. The Lower Tester responds with an Error Response where the error code is 0x83 (Value Out of Range).
  3. The Upper Tester orders the IUT to execute any sub-procedure that reads any characteristic.

- Expected Outcome

  <u>Pass verdict</u>

  The IUT successfully executes the GATT Read Characteristic Value sub-procedure after having received the error code.

MICP/CL/SPE/BI-08-C [Audio Input Control Point – Opcode Not Supported]

- Test Purpose

  Verify that the IUT operation is uninterrupted when it receives the Application Error Code "Opcode Not Supported" from the Audio Input Control Point in response to a Write Request.

- Reference

  [3] 4.5.7

  [7] 3.5.2

- Initial Condition

  - Establish a 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 includes one instantiation of the Audio Input Control Service, including at least the Audio Input Control Point characteristic.

- The IUT has enabled notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure to the Audio Input State Client Characteristic Configuration descriptor.

- The IUT knows the Change_Counter value or retrieves the value from the Audio Input State characteristic by executing the GATT Read Characteristic Value sub-procedure.

- **Test Procedure**

  1. The Upper Tester orders the IUT to execute any Audio Input Control Point sub-procedure.
  2. The Lower Tester responds with an Error Response where the error code is 0x81 (Opcode Not Supported).
  3. The Upper Tester orders the IUT to execute any sub-procedure that reads any characteristic.

- **Expected Outcome**

  Pass verdict

  The IUT successfully executes the GATT Read Characteristic Value sub-procedure after having received the error code.

4.6.2   Audio Input Control Point – Mute Disabled

- **Test Purpose**

  Verify that the IUT operation is uninterrupted when it receives the Application Error Code "Mute Disabled" from the Audio Input Control Point in response to the Mute or Unmute sub-procedure.

- **Reference**

  [3] 4.5.7.2, 4.5.7.3

  [7] 3.5.2.2, 3.5.2.3

- **Initial Condition**

  - Establish a 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 includes one instantiation of the Audio Input Control Service.

  - The Lower Tester has its Mute State on the Audio Input Control Service set to the Mute field setting in Table 4.7.

  - The IUT has enabled notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure to the Audio Input State Client Characteristic Configuration descriptor.

  - The IUT knows the Change_Counter value or retrieves the value from the Audio Input State characteristic by executing the GATT Read Characteristic Value sub-procedure.

- **Test Case Configuration**

Test Case	Procedure	Mute Field Setting
MICP/CL/SPE/BI-09-C [AICP – Mute Disabled - Mute]	Mute	Not Muted
MICP/CL/SPE/BI-10-C [AICP – Mute Disabled - Unmute]	Unmute	Muted

Table 4.7: Mute Disabled test cases

- **Test Procedure**

  1. The IUT executes the sub-procedure specified in Table 4.7.

2. The Lower Tester responds with an Error Response where the error code is 0x82 (Mute Disabled).
3. The Upper Tester orders the IUT to execute any sub-procedure that reads any characteristic.

- Expected Outcome

  Pass verdict

  The IUT successfully executes the GATT Read Characteristic Value sub-procedure after having received the error code.

4.6.3 Audio Input Control Point – Gain Mode Change Not Allowed

- Test Purpose

  Verify that the IUT operation is uninterrupted when it receives the Application Error Code "Gain Mode Change Not Allowed" from the Audio Input Control Point in response to a Write Request.

- Reference

  [3] 4.5.7.4, 4.5.7.5

  [7] 3.5.2.4, 3.5.2.5

- Initial Condition

  - Establish a 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 includes one instantiation of the Audio Input Control Service.

  - The IUT has enabled notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure to the Audio Input State Client Characteristic Configuration descriptor.

- Test Case Configuration

Test Case	Procedure
MICP/CL/SPE/BI-11-C [Gain Mode Change Not Allowed – Set Manual Gain Mode]	Set Manual Gain Mode
MICP/CL/SPE/BI-12-C [Gain Mode Change Not Allowed – Set Automatic Gain Mode]	Set Automatic Gain Mode

Table 4.8: Gain Mode Change Not Allowed test cases

- Test Procedure

  1. The IUT executes the Procedure specified in Table 4.8.
  2. The Lower Tester responds with an Error Response where the error code is 0x84 (Gain Mode Change Not Allowed).
  3. The Upper Tester orders the IUT to execute any sub-procedure that reads any characteristic.

- Expected Outcome

  Pass verdict

  The IUT successfully executes the GATT Read Characteristic Value sub-procedure after having received the error code.

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 Microphone Control Profile [5].

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.

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

Item	Feature	Test Case(s)
MICP 1/1 AND MICP 2/2 AND NOT MICP 2/1 AND MICP 5/1 AND GATT 1a/4	Profile supported over LE not discoverable over BR/EDR and Microphone Control Service	MICP/SR/SGGIT/SDPNF/BV-01-C
MICP 1/1 AND MICP 2/2 AND NOT MICP 2/1 AND MICP 5/2 AND GATT 1a/4	Profile supported over LE not discoverable over BR/EDR and Audio Input Control Service	MICP/SR/SGGIT/SDPNF/BV-02-C
MICP 10/1	Microphone Control Service	MICP/CL/CGGIT/SER/BV-01-C
MICP 11/1	Mute Characteristic	MICP/CL/CGGIT/CHA/BV-01-C
MICP 12/2 AND MICP 12/3	MICS – Error Codes	MICP/CL/SPE/BI-01-C
MICP 10/2	Audio Input Control Service	MICP/CL/CGGIT/SER/BV-02-C
MICP 13/1	Audio Input State Characteristic	MICP/CL/CGGIT/CHA/BV-02-C
MICP 13/2	Gain Setting Properties Characteristic	MICP/CL/CGGIT/CHA/BV-03-C
MICP 13/3	Audio Input Type Characteristic	MICP/CL/CGGIT/CHA/BV-04-C
MICP 13/4	Audio Input Status Characteristic	MICP/CL/CGGIT/CHA/BV-05-C
MICP 13/5	Audio Input Control Point Characteristic	MICP/CL/CGGIT/CHA/BV-06-C
MICP 13/6	Audio Input Description Characteristic	MICP/CL/CGGIT/CHA/BV-07-C
MICP 14/7 OR MICP 14/8 OR MICP 14/9 OR MICP 14/10 OR MICP 14/11	Opcode Not Supported	MICP/CL/SPE/BI-08-C
MICP 14/7	Set Gain Setting	MICP/CL/CP/BV-01-C MICP/CL/SPE/BI-02-C MICP/CL/SPE/BI-07-C

Item	Feature	Test Case(s)
MICP 14/8	Mute Procedure	MICP/CL/CP/BV-02-C MICP/CL/SPE/BI-03-C MICP/CL/SPE/BI-09-C
MICP 14/9	Unmute Procedure	MICP/CL/CP/BV-03-C MICP/CL/SPE/BI-04-C MICP/CL/SPE/BI-10-C
MICP 14/10	Set Manual Gain Mode Procedure	MICP/CL/CP/BV-04-C MICP/CL/SPE/BI-05-C MICP/CL/SPE/BI-11-C
MICP 14/11	Set Automatic Gain Mode Procedure	MICP/CL/CP/BV-05-C MICP/CL/SPE/BI-06-C MICP/CL/SPE/BI-12-C
MICP 1/2 AND MICP 2/1	LE Audio Major Service Class CoD Support – Microphone Controller	MICP/CL/DSC/BV-01-C
MICP 1/1 AND MICP 2/1	LE Audio Major Service Class CoD Support – Microphone Device	MICP/SR/DSC/BV-01-C

Table 5.1: Test case mapping

6   Revision history and acknowledgments

Revision History

Publication Number	Revision Number	Date	Comments
	p0r00–r05	2020-10-27 – 2021-02-01	Editorial and formatting updates for 1.0. Fixed field values in MICP/CL/SPE/BI-01-C. Added class of device tests: MICP/MC/DSC/BV-01-C and -02-C and MICP/MD/DSC/BV-01-C and -02-C. Removed MC/MD roles and changed to CL/SR. Editorial updates and BTI and review comment resolution.
0	p0	2021-03-02	Approved by BTI on 2021-02-11. MICP v1.0 adopted by the BoD on 2021-02-23. Prepared for publication.
	p1r00–r01	2021-09-30 – 2021-10-28	TSE 17589 (rating 2): Rewrote the CoD section tests to clarify the relevant BB procedure and to remove the focus on GAP mode. Updated the TCMT for MICP/SR/DSC/BV-01-C and MICP/CL/DSC/BV-01-C and removed MICP/SR/DSC/BV-02-C and MICP/CL/DSC/BV-02-C. Performed template-related fixes. Updated copyright page to align with v2 of the DNMD.
1	p1	2022-01-25	Approved by BTI on 2021-12-15. Prepared for TCRL 2021-2 publication.
	p2r00	2022-04-05	TSE 18656 (rating 2): Updated initial condition and added a column to the test case config. table to clarify Mute setting for the section containing MICP/CL/SPE/BI-09-C and -10-C.
2	p2	2022-06-28	Approved by BTI on 2022-06-20. Prepared for TCRL 2022-1 publication.
	p3r00	2022-09-29	TSE 20621 (rating 2): Updated test purpose and rounds table for MICP/CL/SPE/BI-01-C.
3	p3	2023-02-07	Approved by BTI on 2022-12-19. Prepared for TCRL 2022-2 publication.

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