Headset Profile (HSP)

Bluetooth® Test Specification

- **Revision**: HSP.TS.1.2.10
- **Revision Date**: 2016-12-13
- **Group Prepared By**: BTI
- **Feedback Email**: bti-main@bluetooth.org

**Abstract:**
This document defines test structures and procedures for the interoperability test of Bluetooth® products implementing the Headset Profile.
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<th>Revision Number</th>
<th>Date</th>
<th>Comments</th>
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<td>1.1</td>
<td>2001-07-02</td>
<td>First version for Specification 1.1</td>
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<td>1.1b</td>
<td>2002-03-12</td>
<td>Includes changes described in Test_Spec_PartK6_1_1_Addendum_Sep02 and ESR 01</td>
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<td>1.2</td>
<td>2004-08-11</td>
<td>Changed revision numbering methodology. Incorporated review comments.</td>
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<td>1.2r1</td>
<td>2004-08-25</td>
<td>Edits to the TCMT, editorial and to correct the reference to HSP ICS document.</td>
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<td>1.2r2</td>
<td>2004-08-26</td>
<td>Added parentheses to TCMT entry for added clarity.</td>
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<td>1.1.2</td>
<td>2005-01-25</td>
<td>Final update after review.</td>
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<td>2008-02-01</td>
<td>TSE 2452: HSP/AG/IAC/BV-02-I, HSP/HS/IAC/BV-02-I (legacy test case ID TP/IAC/BV-02-I): new pass verdict</td>
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<td>1.1.3</td>
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<td>1.1.4r0</td>
<td>2008-11-26</td>
<td>Remove PARK state testing as this is removed from the profile spec.</td>
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<tr>
<td>1.2.4</td>
<td>2008-12-04</td>
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<td>1.2.6r0</td>
<td>2011-01-06</td>
<td>TSE 3102: HSP/AG/IAC/BV-01-I, HSP/HS/IAC/BV-01-I (legacy test case ID TP/IAC/BV-01-I): Pass verdict</td>
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<td>TSE 3184: TP/PAR/BV-01-I, TP/PAR/BV-02-I, TP/PAR/BV-03-I: Remove from TCMT (and TCRL)</td>
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<td></td>
<td></td>
<td>TSE 3825: See TSE 3184: Same resolution.</td>
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<td>Reflects Magnus’s change to HSP/AG/IAC/BV-01-I, HSP/HS/IAC/BV-01-I (legacy test case ID TP/IAC/BV-01-I)</td>
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<td>2012-03-30</td>
<td>Prepare for publication.</td>
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<td>1.2.8r1</td>
<td>2013-05-01</td>
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<td>TSE 5038:</td>
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<td></td>
<td>Updated title from “Headset Profile (HSP) Specification 1.2” to “Headset Profile (HSP) Test Specification 1.1-1.2”</td>
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<td>Added Reference [4], Specification of the Bluetooth System v1.2 or later</td>
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<td>1.2.9r01</td>
<td>2013-09-30</td>
<td>TSE 5305: Updates in 5.3.1 test subgroups objectives. Updated test in HSP/AG/ACR/BV-01-I, HSP/HS/ACR/BV-01-I, HSP/AG/ACR/BV-02-I, and HSP/HS/ACR/BV-02-I (legacy test case IDs TP/ACR/BV-01-I, and TP/ACR/BV-02-I).</td>
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<td>1.2.9r02</td>
<td>2013-10-22</td>
<td>Review by Siegfried</td>
</tr>
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<td>1.2.9</td>
<td>2013-12-03</td>
<td>Prepare for Publication</td>
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<tr>
<td>1.2.10r00</td>
<td>2016-10-03</td>
<td>Converted to new Test Case ID conventions as defined in TSTO v4.1.</td>
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<td>1.2.10r01</td>
<td>2016-11-02</td>
<td>Converted to current template.</td>
</tr>
<tr>
<td>1.2.10</td>
<td>2016-12-13</td>
<td>Approved by BTI. Prepared for TCRL 2016-2 publication.</td>
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4.5.2.1 Microphone gain control – remote/local

4.5.2.2 Microphone gain control – remote

4.5.2.3 Microphone gain control – store settings

5 Test Case Mapping
1 Scope

This Bluetooth document contains the Test Suite Structure (TSS) and Test Cases (TC) to test the Headset Profile Specification.

The objective of this document is to provide a basis for the interoperability tests for Bluetooth devices giving a high probability of air interface interoperability between different manufacturers’ Bluetooth devices.
# 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 v2.0 or later
2. Headset Profile Specification v1.1 or later
3. ICS Proforma for Headset Profile
4. Bluetooth Test Strategy and Terminology Overview
5. Headset Profile Specification v1.2 or later

## 2.2 Definitions

For the purpose of this Bluetooth document, the definitions from [1] and [4] apply.

<table>
<thead>
<tr>
<th>Terms</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Standby Mode</td>
<td>a) For HS: no connection to AG</td>
</tr>
<tr>
<td></td>
<td>b) For AG: no active call and no connection to HS</td>
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*Table 2.1: Definitions*

## 2.3 Acronyms and Abbreviations

For the purpose of this Bluetooth document, the abbreviations from [1] and [4] apply.
3 Test Suite Structure (TSS)

3.1 Overview

Figure 3.1 shows the Headset profile Test Suite Structure (TSS) including its subgroups defined for testing.

**Figure 3.1: TSS for the Headset Profile**

3.2 Test Groups

The test groups are organized in 3 levels. The first level defines the profile procedure groups representing the profile procedures. The second level, if the third level exists, separates the profile procedures in functional modules. The last level in each branch contains the standard ISO subgroups BV and BI.

3.2.1 Profile Procedure Groups

The profile procedure groups identify the Bluetooth Headset Profile services: Audio connection establishment, audio connection release, audio connection transfer and remote audio volume control as defined in [2].

3.2.2 Initialization

Before performing any test cases, an initialization procedure between HS and AG has to be performed to ensure that the devices have stored the information with which device they have to interoperate while performing the headset profile. As this procedure depends on the implementation and capabilities of the devices and is not part of the Headset Profile Specification it is not covered by any test case. For all test cases, it is assumed as a general precondition that this initialization has been performed for this pair of devices.
4 Test Cases (TC)

4.1 Introduction

4.1.1 Test Case Identification Conventions

Test cases shall be assigned unique identifiers per the conventions in [4]. The convention used here is `<spec abbreviation>/<IUT role>/<class>/<func>/<subfunc>/<cap>/<xx>-<nn>-<yy>`.

Bolded ID parts shall appear in the order prescribed. Non-bolded ID parts (if applicable) shall appear between the bolded parts. The order of the non-bolded parts may vary from test specification to test specification, but shall be consistent within each individual test specification.

<table>
<thead>
<tr>
<th>Identifier Abbreviation</th>
<th>Feature Identifier <code>&lt;feat&gt;</code></th>
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<tr>
<td>HSP</td>
<td>Headset Profile</td>
</tr>
<tr>
<td>HS</td>
<td>Headset Role</td>
</tr>
<tr>
<td>AG</td>
<td>Audio Gateway Role</td>
</tr>
<tr>
<td>IAC</td>
<td>Incoming Audio Connection Establishment</td>
</tr>
<tr>
<td>OAC</td>
<td>Outgoing Audio Connection Establishment</td>
</tr>
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<td>ACR</td>
<td>Audio Connection Release</td>
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<tr>
<td>ACT</td>
<td>Audio Connection Transfer</td>
</tr>
<tr>
<td>RAV</td>
<td>Remote Audio Volume Control</td>
</tr>
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</table>

Table 4.1: Headset Profile TC Feature Naming Conventions

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 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 are 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 shall be the Fail Verdict.

4.2 Audio Connection Establishment

Test group objectives:

- To verify the audio connection establishment.

4.2.1 Incoming Audio Connection Establishment

Test subgroup objectives:

- To verify the connection establishment initiated from the audio gateway.

4.2.1.1 Incoming Connection Establishment - AG

• Test Case ID(s)

HSP/HS/IAC/BV-01-I

HSP/AG/IAC/BV-01-I

• Test Purpose

HS: To verify that the HS accepts a complete connection establishment initiated from the AG.

AG: To verify that the AG can establish a complete audio connection towards the HS.

• Reference

[2] 4.2

• Initial Condition

Both devices are initialized (see Section 3.2.2).

HS: Standby mode.
AG: Standby mode.

Configure the AG to pass an incoming call/audio connection to the HS.

- **Test Procedure**
  AG:
  Initiate a call/audio connection to the AG from a test device.

  HS:
  The HS or AG might be alerted. In that case establish the connection by the corresponding user action (e.g. press button) at the HS.

- **Expected Outcome**
  Pass verdict

  HS:
  If an alert is provided the followed user action on the HS establishes the call/audio connection and bi-directional conversation or any other intended audio application is possible.
  
  If no alert is provided the call/audio connection is established without any further user action and bi-directional conversation or any other intended audio application is possible.
  
  In the case where the AG has opened a SCO connection with in-band ring tone before sending the RING command, the HS may provide no other alert besides the playback of in-band ring. User action on the HS establishes the call/audio connection and bi-directional conversation or any other intended audio application is possible.

  AG:
  A call/audio connection is established.

### 4.2.1.2 Incoming Connection Establishment – inband ring

- **Test Case ID(s)**

  HSP/HS/IAC/BV-02-I
  HSP/AG/IAC/BV-02-I

- **Test Purpose**
  HS: To verify that, if supported and provided by the AG, the HS gives an in-band ringing tone during connection establishment initiated from the AG.
  
  AG: To verify that, if supported and provided by the AG, the AG can cause the HS to give an in-band ringing tone during connection establishment initiated from the AG.

- **Reference**
  [2] 4.2

- **Initial Condition**
Both devices are initialized (see Section 3.2.2).

HS: Standby mode.

AG: Standby mode.

The AG is configured to provide an in-band ring tone.

- **Test Procedure**
  - AG:
    Initiate a call/audio connection to the AG from a test device.
  
  - HS:
    Upon alerting in the HS earpiece, establish the connection by the corresponding user action (e.g. press button) at the HS.

- **Expected Outcome**
  - **Pass verdict**
    
    - HS:
      Upon the call/audio connection initiation to the AG, the HS alerts the user.
      
      The followed user action on the HS establishes the call/audio connection and bi-directional conversation is possible.
      
      - AG:
        No RING unsolicited response code is sent by the AG
        
  A call/audio connection is established.

### 4.2.2 Outgoing Audio Connection Establishment

Test subgroup objectives:

- To verify the connection establishment initiated from the headset.

#### 4.2.2.1 Outgoing Connection establishment - HS

- **Test Case ID(s)**
  
  - **HSP/HS/OAC/BV-01-I**
  
  - **HSP/AG/OAC/BV-01-I**

- **Test Purpose**
  
  - HS: To verify that the HS can establish a complete audio connection towards the AG.
  
  - AG: To verify that the AG accepts a complete connection establishment initiated from the HS.

- **Reference**
  
  [2] 4.2

- **Initial Condition**
Both devices are initialized (see Section 3.2.2).

HS: Standby mode.
AG: Standby mode.

The AG has to be prepared for establishing outgoing connections upon user action on the HS (e.g. last dialed or pre-programmed number). The manufacturer must state, which options for determination of the number are implemented. It is sufficient to test with one of these.

- **Test Procedure**
  - **HS**: Initiate the user action (e.g. press button) on the HS to establish an outgoing call/audio connection.
  - **AG**: No user action is required.

- **Expected Outcome**
  - **Pass verdict**

  - **HS**: The user action on the HS establishes the call/audio connection and bi-directional conversation is possible.
  - **AG**: A call/audio connection is established.

## 4.3 Audio Connection Release

Test group objectives:

- To verify the connection release.

### 4.3.1 Audio Connection Release Initiated from the HS

Test subgroup objectives:

- To verify the connection release initiated from the HS.

#### 4.3.1.1 Audio Connection Release - HS

- **Test Case ID(s)**

  - **HSP/HS/ACR/BV-01-I**
  - **HSP/AG/ACR/BV-01-I**

- **Test Purpose**
  - **HS**: To verify a connection release initiated from the headset.
  - **AG**: To verify that the AG accepts a connection release initiated from the headset.

- **Reference**
• Initial Condition
  Both devices are initialized (see Section 3.2.2).

  HS: A call/audio connection is active.

  AG: A call/audio connection is active (voice I/O on HS).

• Test Procedure
  HS:
  Initiate the user action (e.g. press button) on the headset to release the connection.

  AG:
  No user action is required.

• Expected Outcome
  Pass verdict

  HS:
  Upon the user action, the HS shall send AT+CKPD=200 command to the AG.

  AG:
  The AG shall release the call/audio connection.

4.3.2 Audio Connection Release Initiated from the AG
Test subgroup objectives:

  - To verify the connection release initiated from the AG.

4.3.2.1 Audio Connection Release - AG
• Test Case ID(s)

  HSP/HS/ACR/BV-02-I

  HSP/AG/ACR/BV-02-I

• Test Purpose
  HS: To verify that the HS accepts an audio connection release initiated on the AG.

  AG: To verify an audio connection release initiated on the AG.

• Reference
  [2] 4.4

  [5] 4.5

• Initial Condition
Both devices are initialized (see Section 3.2.2).

HS: A call/audio connection is active.

AG: A call/audio connection is active (voice I/O on HS).

• Test Procedure
  HS:
  No user action is required.

  AG:
  Initiate the user action or internal event to release the connection.

• Expected Outcome
  Pass verdict

  The user action on the AG releases the call/audio connection.

### 4.4 Audio Connection Transfer

Test group objectives:

- To verify the audio connection transfer.

#### 4.4.1 Audio Connection Transfer from AG to HS

Test subgroup objectives:

- To verify the audio connection transfer from the AG to the HS.

#### 4.4.1.1 Connection transfer – HS initiated

• Test Case ID(s)

  HSP/HS/ACT/BV-01-I

  HSP/AG/ACT/BV-01-I

• Test Purpose
  HS: To verify the audio connection transfer from AG to HS initiated by a user action on the headset.

  AG: To verify that the AG can perform an audio connection transfer from AG to HS initiated by a user action on the headset.

• Reference
  [2] 4.5.1

  [5] 4.6.1

• Initial Condition
  Both devices are initialized (see Section 3.2.2).

  HS: Standby mode.
AG: A call/audio connection is active at the AG.

- **Test Procedure**
  
  HS: Initiate the user action (e.g. press button) on the HS to transfer the audio connection from AG to HS.
  
  AG: No user action is required.
  
- **Expected Outcome**
  
  **Pass verdict**
  
  The user action on the HS transfers the audio connection from AG to HS.

  HS: The call/audio connection is ongoing on the HS.

- **Notes**
  
  There is no dependency in this test case on the state of the AG’s connection status with external entities.

  AG initial state: explanation of the ‘available call/audio connection.’ For a cellular phone the available connection may be an external call. For a PC the available connection may be to an audio application that may or may not have audio I/O on the PC.

### 4.4.2 Audio Connection Transfer from HS to AG

Test subgroup objectives:

  - To verify the audio connection transfer initiated by a user action on the AG.

#### 4.4.2.1 Connection transfer – AG initiated

- **Test Case ID(s)**

  - **HSP/HS/ACT/BV-02-I**
  - **HSP/AG/ACT/BV-02-I**

- **Test Purpose**

  HS: To verify that the HS accepts an audio connection transfer from HS to AG initiated by a user action on the AG.

  AG: To verify the audio connection transfer from HS to AG initiated by a user action on the AG.

- **Reference**

  [2] 4.5.1

  [5] 4.6.1

- **Initial Condition**
Both devices are initialized (see Section 3.2.2).

HS: A call/audio connection to AG is ongoing with audio I/O on HS.

AG: A call/audio connection to HS is ongoing.

- **Test Procedure**
  
  HS:
  No user action is required.

  AG:
  Initiate the user action (e.g. press button) on the AG to transfer the audio connection from HS to AG.

- **Expected Outcome**
  
  **Pass verdict**
  
  The user action on the AG transfers the audio connection from HS to AG.

  The HS returns to Standby mode.

  The call/audio connection is available at the AG.

- **Notes**
  
  There is no dependency in this test case on the state of the AG’s connection status with external entities.

  AG final state: explanation of ‘available call/audio connection.’ For a cellular phone the available connection may be an external call. For a PC the available connection may be to an audio application that may or may not have audio I/O on the PC.

## 4.5 Remote Audio Volume Control

Test group objectives:

- To verify the microphone and speaker gain control of the headset.

### 4.5.1 Remote Speaker Volume Control

Test subgroup objectives:

- To verify the speaker gain control of the headset.

#### 4.5.1.1 Speaker volume control – remote/local

- **Test Case ID(s)**
  
  HSP/HS/RAV/BV-01-I

  HSP/AG/RAV/BV-01-I

- **Test Purpose**
  
  HS: To verify the speaker volume control of the headset if remote and local speaker volume control is supported.
AG: To verify the speaker volume control of the headset if remote and local speaker volume control is supported.

• Reference
  [2] 4.6

• Initial Condition
  Both devices are initialized (see Section 3.2.2).

HS: A call/audio connection is active.
AG: A call/audio connection is active (voice I/O on HS).

• Test Procedure
  AG:
  Initiate the user action (e.g. press button) on the AG to set the speaker volume on the HS to a level significantly higher than the nominal level.

  HS:
  Initiate the user action (e.g. press button) on the HS to decrease the speaker volume to a level significantly lower than the nominal level.

  AG:
  Initiate the user action (e.g. press button) on the AG to increase the speaker volume on the HS to the nominal level.

• Expected Outcome
  Pass verdict

  The user actions on the HS and AG result in the respective speaker volume settings.

4.5.1.2 Speaker volume control – remote

• Test Case ID(s)
  HSP/HS/RAV/BV-02-I
  HSP/AG/RAV/BV-02-I

• Test Purpose
  HS: To verify the speaker volume control of the headset if remote speaker volume control is supported.

  AG: To verify the speaker volume control of the headset if remote speaker volume control is supported.

• Reference
  [2] 4.6
• Initial Condition
Both devices are initialized (see Section 3.2.2).

HS: A call/audio connection is active.
AG: A call/audio connection is active (voice I/O on HS).

• Test Procedure
AG:
Initiate the user action (e.g. press button) on the AG to set the speaker volume on the HS to the maximum level.
Initiate the user action (e.g. press button) on the AG to set the speaker volume on the HS to the minimum level.

HS:
No user action is required.

• Expected Outcome
Pass verdict
The user actions on the HS and AG result in the respective speaker volume settings.

4.5.1.3 Speaker volume control – store settings

• Test Case ID(s)
HSP/HS/RAV/BV-03-I
HSP/AG/RAV/BV-03-I

• Test Purpose
HS: To verify that if storing the speaker volume settings in the HS is supported the correct settings are used when establishing a new connection.
AG: To verify that if storing the speaker volume settings in the HS is supported the correct settings are used when establishing a new connection.

• Reference
[2] 4.6

• Initial Condition
Both devices are initialized (see Section 3.2.2).

HS: A call/audio connection is active.
AG: A call/audio connection is active (voice I/O on HS).
• Test Procedure
  1. Set the volume control to a value significantly different from the nominal volume either by the HS or AG.
  2. Release the connection either by HS or AG.
  3. Establish a new connection to the HS either by HS or AG.

• Expected Outcome
  Pass verdict

  HS:
  After establishing the new connection the speaker volume is restored to the value which was set before releasing the call/audio connection.

  AG:
  The user may be notified of the restored volume level after establishing the new call/audio connection.

4.5.2 Remote Microphone Gain Control
Test subgroup objectives:

- To verify the microphone gain control of the headset.

4.5.2.1 Microphone gain control – remote/local
• Test Case ID(s)
  HSP/HS/RAV/BV-04-I
  HSP/AG/RAV/BV-04-I

• Test Purpose
  HS: To verify the microphone gain control of the headset if remote and local microphone gain control is supported.

  AG: To verify the microphone gain control of the headset if remote and local microphone gain control is supported.

• Reference
  [2] 4.6

• Initial Condition
  Both devices are initialized (see Section 3.2.2).

  HS: A call/audio connection is active.

  AG: A call/audio connection is active (voice I/O on HS).

• Test Procedure
AG: Initiate the user action (e.g. press button) on the AG to set the microphone gain on the HS to the maximum level.

HS: Initiate the user action (e.g. press button) on the HS to set the microphone gain to the nominal level.

AG: Initiate the user action (e.g. press button) on the AG to set the microphone gain on the HS to the minimum level.

- Expected Outcome
  - Pass verdict

The user actions on the HS and AG result in the respective microphone gain settings.

4.5.2.2 Microphone gain control – remote

- Test Case ID(s)
  - HSP/HS/RAV/BV-05-I
  - HSP/AG/RAV/BV-05-I

- Test Purpose
  - HS: To verify the microphone gain control of the headset if remote microphone gain control is supported.
  - AG: To verify the microphone gain control of the headset if remote microphone gain control is supported.

- Reference
  - [2] 4.6
  - [5] 4.7

- Initial Condition
  - Both devices are initialized (see Section 3.2.2).
  - HS: A call/audio connection is active.
  - AG: A call/audio connection is active (voice I/O on HS).

- Test Procedure
  - AG:
    - Initiate the user action (e.g. press button) on the AG to set the microphone gain on the HS to the maximum level.
    - Initiate the user action (e.g. press button) on the AG to set the microphone gain on the HS to the minimum level.
Headset Profile (HSP) / Test Specification

HS:
No user action required.

- Expected Outcome
  Pass verdict

  The user actions on the AG result in the respective microphone gain settings.

- Notes
  Due to automatic gain control it might be impossible to examine and evaluate the result.

4.5.2.3 Microphone gain control – store settings

- Test Case ID(s)
  HSP/HS/RAV/BV-06-I
  HSP/AG/RAV/BV-06-I

- Test Purpose
  HS: To verify that if storing the microphone gain settings in the HS is supported the correct settings are used when establishing a new connection.

  AG: To verify that if storing the microphone gain settings in the HS is supported the correct settings are used when establishing a new connection.

- Reference
  [2] 4.6

- Initial Condition
  Both devices are initialized (see Section 3.2.2).

  HS: A call/audio connection is active.

  AG: A call/audio connection is active (voice I/O on HS).

- Test Procedure
  1. Set the microphone gain control to a value significantly different from the nominal level either by HS or AG.
  2. Release the connection either by HS or AG.
  3. Establish a new connection to the HS either by HS or AG.

- Expected Outcome
  Pass verdict

  HS:
  After establishing the new connection the microphone gain is restored to the value which was set before releasing the call/audio connection.
AG:
The user may be notified of the restored volume level after establishing the new call/audio connection.

- Notes
  Due to automatic gain control it might be impossible to examine and evaluate the result.
## 5 Test Case Mapping

The Test Case Mapping Table (TCMT) maps test cases to specific requirements in the ICS. The product shall be 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 y/x reference, where y corresponds to the table number and x corresponds to the feature number as defined in the ICS Proforma for Headset profile (HSP) [3]. If the item is defined with Protocol, Profile or Service abbreviation before y/x, the table and feature number referenced are defined in the abbreviated ICS Proforma document.

- **Feature**: Recommended to be the primary feature defined in the ICS being tested or may be the test case name.

- **Test Case(s)**: The applicable test case identifiers required for Bluetooth Qualification if the corresponding y/x references defined in the Item column are supported.

- **Test Case Applicable**: May be used to note if a test is required based on the supported features.

For purpose and structure of the ICS/IXIT Proforma and instructions for completing the ICS/IXIT Proforma refer to the Bluetooth ICS and IXIT Proforma document.

<table>
<thead>
<tr>
<th>Item</th>
<th>Feature</th>
<th>Test Case(s)</th>
<th>Test Case Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSP 2/1</td>
<td>Incoming audio connection establishment</td>
<td>HSP/AG/IAC/BV-01-I</td>
<td></td>
</tr>
<tr>
<td>HSP 3/1</td>
<td>Incoming audio connection establishment</td>
<td>HSP/HS/IAC/BV-01-I</td>
<td></td>
</tr>
<tr>
<td>HSP 2/3</td>
<td>Inband ring tone</td>
<td>HSP/AG/IAC/BV-02-I</td>
<td></td>
</tr>
<tr>
<td>HSP 3/3</td>
<td>Inband ring tone</td>
<td>HSP/HS/IAC/BV-02-I</td>
<td></td>
</tr>
<tr>
<td>HSP 2/4</td>
<td>Outgoing audio connection establishment</td>
<td>HSP/AG/OAC/BV-01-I</td>
<td></td>
</tr>
<tr>
<td>HSP 3/4</td>
<td>Outgoing audio connection establishment</td>
<td>HSP/HS/OAC/BV-01-I</td>
<td></td>
</tr>
<tr>
<td>HSP 2/5</td>
<td>Audio connection release from HS</td>
<td>HSP/AG/ACR/BV-01-I</td>
<td></td>
</tr>
<tr>
<td>HSP 3/5</td>
<td>Audio connection release from HS</td>
<td>HSP/HS/ACR/BV-01-I</td>
<td></td>
</tr>
<tr>
<td>HSP 2/6</td>
<td>Audio connection release from AG</td>
<td>HSP/AG/ACR/BV-02-I</td>
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</tr>
</tbody>
</table>
### Table 5.1: Test Case Mapping

<table>
<thead>
<tr>
<th>Item</th>
<th>Feature</th>
<th>Test Case(s)</th>
<th>Test Case Applicable</th>
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<tbody>
<tr>
<td>HSP 3/6</td>
<td>Audio connection release from AG</td>
<td>HSP/HS/ACR/BV-02-I</td>
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<tr>
<td>HSP 2/7</td>
<td>Audio connection transfer: AG to HS</td>
<td>HSP/AG/ACT/BV-01-I</td>
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<tr>
<td>HSP 3/7</td>
<td>Audio connection transfer: AG to HS</td>
<td>HSP/HS/ACT/BV-01-I</td>
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<tr>
<td>HSP 2/8</td>
<td>Audio connection transfer: HS to AG</td>
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<td>Audio connection transfer: HS to AG</td>
<td>HSP/HS/ACT/BV-02-I</td>
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<td>HSP 2/9</td>
<td>Remote audio volume control</td>
<td>HSP/AG/RAV/BV-02-I</td>
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<td>HSP 3/9</td>
<td>Remote audio volume control</td>
<td>HSP/HS/RAV/BV-02-I</td>
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<tr>
<td>HSP 2/10</td>
<td>Local audio volume control</td>
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<td>HSP 2/13</td>
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<tr>
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