



CTIA *Bluetooth*[®] Compatibility Test Plan

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CTIA Certification Program

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Section 1 Introduction

1.1 Purpose

The purpose of this Test Plan is to define the CTIA Certification Program requirements for *Bluetooth* compatibility testing. This testing is conducted from an end-user perspective and evaluates the implementation, integration, and interaction between two *Bluetooth*^{®1} devices that support complementary profiles and roles.

The process and procedures for CTIA *Bluetooth* Compatibility Certification are described in the CTIA *Bluetooth* Compatibility Certification Program Management Document (BCCPMD).

1.2 Scope

Bluetooth compatibility testing for the CTIA Certification Program is limited to devices that have cellular capability or are designed to be interoperable with devices that have cellular capability.

1.3 Applicable Documents

The following documents are referenced in this Test Plan:

CTIA *Bluetooth* Compatibility Certification Program Management Document, Latest Revision, CTIA.

1.4 Test Process & Procedures

All testing shall be conducted at a CTIA Authorized Testing Laboratory (CATL). A current list of CATLs can be found on the CTIA web site at http://www.ctia.org/business_resources/certification/test_labs/. Products shall be submitted for testing in accordance with the instructions detailed in the BCCPMD. All A-Device features available to the user shall be claimed in the A-Device feature support spreadsheet and tested.

During testing, if the UI contradicts the user experience as defined in the product user manual, it shall be reported as a failure. (*Example: Devices disconnect the Bluetooth link, but the UI on a AG indicates that the Bluetooth connection is still up*).

The test report shall include the minimum information as described in the BCCPMD.

¹ *Bluetooth* is a registered trademark of the Bluetooth SIG, Inc.

1.5 Acronyms

A2DP	Advanced Audio Distribution Profile
AG	Audio Gateway
AVRCP	Audio/Video Remote Control Profile
BCCPMD	<i>Bluetooth</i> Compatibility Certification Program Management Document
CATL	CTIA Authorized Testing Laboratory
CDMA	Code Division Multiple Access
FF	Fast Forward
GSM	Global System for Mobile
HF	Hands Free
HFP	Hands Free Profile
HSP	Headset Profile
IOT	Interoperability is the ability for two devices that support <i>Bluetooth</i> compatible profiles and roles to interact and to fulfill a purpose using <i>Bluetooth</i> wireless technology as tested through the Bluetooth SIG's qualification program.
MT	Mobile Terminated
PBAP	Phonebook Access Profile
PCE	Phone Book Client Equipment
PSE	Phone Book Server Equipment
REW	Rewind
SMS	Short Message Service
SNK	Sink
SRC	Source

Section 2 Hands Free Validation

2.1 Connection Management

2.1.1 Pairing and Connection

2.1.1.1 Pairing and Connection

Requirements: HFP

Purpose: Validate pairing and connection between the AG and HF.

Test Configuration:

1. The AG and HF batteries are charged.
2. The AG is in idle mode.

Procedure:

1. Set the HF to pairing mode (discoverable).
2. Initiate a device search from AG.
3. Verify the AG discovers the HF device (AG displays HF name).
4. Select the HF device.
5. Enter the PIN code at the AG when requested (manually or automatically sent by AG).
6. Verify pairing is completed (AG display pairing successful).
7. Connect the devices from the AG, if not automatically connected.
8. Verify the AG and HF devices are connected (incoming and outgoing calls alert through HF).

Expected Result: The AG and HF shall be paired and connected.

2.1.1.2 Delete *Bluetooth* HF Device After Disconnect

Requirements: HFP

Purpose: Validate from the AG, *Bluetooth* HF device can be deleted after disconnected.

Test Configuration:

1. The AG and HF batteries are charged.
2. The AG and HF are paired and disconnected.
3. The AG and HF devices are in idle mode.

Procedure:

1. From AG, delete the HF.
2. Verify the HF device is deleted from AG.
3. Make an incoming call, the alert shall go through AG.
4. Make and outgoing call, the call stays on AG after the called party answers.

Expected Result: The HF shall be deleted from AG and shall not reconnect.

2.1.1.3. Delete *Bluetooth* HF Device while connected

Requirements: HFP

Purpose: Validate from the AG, when the *Bluetooth* HF devices is deleted, either the HF device is disconnected autonomously or with a user prompt.

Test Configuration:

1. The AG and HF batteries are charged.
2. The AG and HF are paired and connected.
3. The AG and HF devices are in idle mode.

Procedure:

1. From the AG, take appropriate actions to delete the HF.
2. Check if the AG and HF are disconnected.
3. Check if the AG deletes the HF.
4. Make a call to the phone.
5. Attempt to connect to the AG using HF device.

Expected Result: The HF shall be removed from the AG trusted device list and shall not succeed in reconnecting without a new pairing. The phone calls to the AG use the AG audio means.

2.1.2. Disconnection

2.1.2.1. Disconnect From AG

Requirements: HFP

Purpose: Validate a *Bluetooth* device can be disconnected from AG.

Test Configuration:

1. The AG and HF batteries are charged.
2. The AG and HF are paired and connected.
3. The AG and HF devices are in an idle state.
4. The AG supports a disconnect menu option.

Procedure:

1. From AG disconnect the HF.
2. Verify the HF device is disconnected.
3. Make an incoming call, the alert shall go through AG.
4. Make an outgoing call, the call stays on AG after the called party answers.

Expected Result: The AG and HF shall remain disconnected.

2.1.2.2. Disconnect From HF

Requirements: HFP

Purpose: Validate a *Bluetooth* device can be disconnected from HF.

Test Configuration:

1. The AG and HF batteries are charged.
2. The AG and HF are paired and connected.
3. The AG and HF devices are in idle mode.

Procedure:

1. From HF disconnect the AG (power off the HF device).
2. Verify the HF device is disconnected.
3. Make an incoming call, the alert shall go through AG.
4. Make an outgoing call, the call stays on AG after the called party answers.

Expected Result: The AG and HF shall remain disconnected.

2.2 Call Processing

2.2.1. Incoming Call

2.2.1.1. Incoming Call – Answered From AG

Requirements: HFP

Purpose: Validate an incoming call can be answered from AG when the AG and HF are paired and connected.

Test Configuration:

1. Both the HF and AG batteries are charged.
2. The AG has a valid subscription number.
3. The AG and HF are paired and connected.

Procedure:

1. Receive an incoming call.
2. Verify that the HF provides an alert of the incoming call.
3. Answer the call from the AG.
4. Verify the call is present at the HF.
5. If not, perform an audio transfer to the HF.
6. Verify uplink/downlink audio is present at the HF.
7. End the call from the AG.

Expected Result: The call shall be answered from the AG.

2.2.1.2. Incoming Call – Answered From HF

Requirements: HFP

Purpose: Validate an incoming call can be answered from the HF when the AG and HF are paired and connected.

Test Configuration:

1. Both the HF and AG batteries are charged.
2. The AG has a valid subscription number.
3. The AG and HF are paired and connected.

Procedure:

1. Receive an incoming call.

2. Verify that the HF provides an alert of the incoming call.
3. Answer the call from the HF.
4. Verify the call is present at the HF.
5. Verify uplink/downlink audio is present at the HF.
6. End the call from the AG.

Expected Result: Incoming call shall be answered from the HF.

2.2.1.3. Incoming Call – Terminate From AG

Requirements: HFP

Purpose: Validate an incoming call can be terminated from the AG when the AG and HF are paired and connected.

Test Configuration:

1. Both the HF and AG batteries are charged.
2. The AG has a valid subscription number.
3. The AG and HF paired and connected.

Procedure:

1. Receive an incoming call.
2. Verify that the HF provides an alert of the incoming call.
3. Answer the call, (uplink/ downlink audio at HF). After the call, verify the audio is at the HF.
4. Terminate the call from the AG.
5. Verify call is terminated

Expected Result: The Incoming call shall be terminated from the AG.

2.2.1.4. Incoming Call – Terminate From HF

Requirements: HFP

Purpose: Validate an incoming call can be terminated from the HF when the AG and HF are paired and connected.

Test Configuration:

1. Both the HF and AG batteries are charged.
2. The AG has a valid subscription number.
3. The AG and HF paired and connected.

Procedure:

1. Receive an incoming call.
2. Verify that the HF provides an alert of the incoming call.
3. Answer the call, (uplink/downlink audio at HF).
4. Terminate the call from the HF.
5. Verify the call is terminated

Expected Result: The incoming call shall be terminated from the HF.

2.2.1.5. Incoming Call – Reject From HF

Requirements: HFP

Purpose: Validate a call can be rejected from the HF when the AG and HF are paired and connected.

Test Configuration:

1. Both the HF and AG batteries are charged.
2. The AG has a valid subscription number.
3. The AG and HF paired and connected.

Procedure:

1. Receive an incoming call.
2. Verify the call alert is sent through the HF.
3. Reject the call from the HF.

Expected Result: The call shall be rejected from the HF and the HF shall indicate that the call was rejected.

2.2.1.6. Incoming Call – Reject From AG

Requirements: HFP

Purpose: Validate a call can be rejected from the AG when the AG and HF are paired and connected.

Test Configuration:

1. Both the HF and AG batteries are charged.
2. The AG has a valid subscription number.
3. The AG and HF paired and connected.

Procedure:

1. Receive an incoming call.
2. Verify the call alert is sent through the HF.
3. Reject the call from the AG.

Expected Result: The call shall be rejected from the AG and the HF shall indicate that the call was rejected.

2.2.2. Outgoing Call

2.2.2.1. Outgoing Call – Initiated From AG

Requirements: HFP

Purpose: Validate an outgoing call can be initiated from the AG after the AG and HF are paired and connected.

Test Configuration:

1. Both the HF and AG batteries are charged.
2. The AG has a valid subscription number.
3. The AG and HF paired and connected.

Procedure:

1. Initiate an outgoing call from the AG.
2. Verify if the call is present at the HF.
3. If not, perform an audio transfer to the HF.
4. Verify uplink/ downlink audio are present at the HF.
5. End the call from the AG.

Expected Result: The call shall be initiated from the AG.

2.2.2.2. Outgoing Call – Initiated From HF

Requirements: HFP

Purpose: Validate an outgoing call can be initiated from the HF after the AG and HF are paired and connected.

Test Configuration:

1. Both the HF and AG batteries are charged.
2. The AG has a valid subscription number.
3. The AG and HF paired and connected.
4. The HF must be able to provide a number to the AG.

Procedure:

1. Initiate an outgoing call from the HF.
2. Verify the call is present at the HF.
3. Verify uplink/downlink audio are present at the HF.
4. End the call from the AG.

Expected Result: The call shall be initiated from HF.

2.2.2.3. Outgoing Call – Terminate From AG

Requirements: HFP

Purpose: Validate an outgoing call can be terminated from AG when the AG and HF are paired and connected.

Test Configuration:

1. Both the HF and AG batteries are charged.
2. The AG has a valid subscription number.
3. The AG and HF paired and connected.

Procedure:

1. Initiate an outgoing call from the AG.
2. Verify uplink/downlink audio are at the HF.
3. Terminate the call from the AG.
4. Verify the call is terminated

Expected Result: The outgoing call shall be terminated from the AG.

2.2.2.4. Outgoing Call – Terminate From HF

Requirements: HFP

Purpose: Validate an outgoing call can be terminated from the HF when the AG and HF are paired and connected.

Test Configuration:

1. Both the HF and AG batteries are charged.
2. The AG has a valid subscription number.
3. The AG and HF paired and connected.

Procedure:

1. Initiate an outgoing call from the AG.
2. Verify uplink/downlink audio are at the HF.
3. Terminate the call from the HF.
4. Verify the call is terminated

Expected Result: The outgoing call shall be terminated from HF.

2.2.2.5. Last Number Redialed – From HF

Requirements: HFP

Purpose: Validate the last number dialed can be redialed from HF.

Test Configuration:

1. Both the HF and AG batteries are charged.
2. The AG has a valid subscription number.
3. The AG and HF paired and connected.
4. The AG and HF are in idle mode.
5. The HF supports last number redialed.

Procedure:

1. Make a call from AG to number “X”.
2. Receive an incoming call from number “Y”.
3. Verify that the HF provides an alert of the incoming call.
4. Perform last number redialed function from the HF.
5. Verify number “X” is dialed.

Expected Result: The AG shall redial the last number dialed.

2.2.2.6. Place a Call Using Voice Recognition

Requirements: HFP

Purpose: Verify the performance of calling someone using voice recognition by using the button in HF.

Test Configuration:

1. Voice Recognition feature shall be available in the AG.
2. The AG and HF shall be paired and connected and within range of each other.
3. The device under test shall have the calling contact stored in the AG.

4. Button functionality and voice commands for voice recognition in the HF will be specified in user manual.

Procedure:

1. Press the button in the HF or initiate a command using voice activated commands from the HF.
2. Say a command <command to call a contact> in the microphone of the HF.
3. The AG will start the voice input sequence.
4. Speak through the HF and Say a contact name (ex: John).

Expected Result: The correct contact shall be dialed.

2.2.2.7. Dial a Number Using Voice Recognition

Requirements: HFP

Purpose: Validate the performance of dialing a phone number using voice recognition from the HF.

Test Configuration:

1. Voice Recognition feature shall be available in the AG.
2. The AG and HF should be paired, connected, and within range of each other.
3. Button functionality and voice commands for voice recognition in the HF will be specified in user manual.
4. Before this test is conducted with a *Bluetooth* headset, it needs to be conducted with no headset connected and compare the accuracy of the voice recognition.

Procedure:

1. Press the button in the HF or initiate a command using voice activated commands from the HF
2. Say a command <command to dial a number> in the microphone of HF.
3. The AG will start the voice input sequence.
4. Speak through the HF and say a valid phone number.

Expected Result: AG shall dial the phone number.

2.3 Call Status Update

2.3.1. HF Call Indicators

2.3.1.1. After Calls – HF Call Indicators Reset (AG Terminate)

Requirements: HFP, call indicators

Purpose: Validate The HF device resets call indicators after call completion.

Test Configuration:

1. Both the HF and AG batteries are charged.
2. The AG has a valid subscription number.
3. The AG and HF paired and connected.

Procedure:

1. Initiate an outgoing call from the AG.

2. Verify the uplink/downlink audio are at the HF.
3. Terminate the call at the AG.

Expected Result: The HF call status indicators shall be reset after call completion. Check for visual or audio indication when the call is released.

2.3.1.2. After Calls – HF Call Indicators reset (HF Terminate)

Requirements: HFP, Visual call indicators

Purpose: Validate The HF device resets call indicators after call completion.

Test Configuration:

1. Both the HF and AG batteries are charged.
2. The AG has a valid subscription number.
3. The AG and HF paired and connected.

Procedure:

1. Initiate an outgoing call from the AG.
2. Verify the uplink/downlink audio are at the HF.
3. Terminate the call at the HF.

Expected Result: The HF call status indicators shall be reset after call completion. Check for visual or audio indication when the call is released.

2.3.1.3. After Calls – HF Call Indicators Reset (Remote Party Terminate)

Requirements: HFP, Visual call indicators

Purpose: Validate The HF device resets call indicators after call completion.

Test Configuration:

1. Both the HF and AG batteries are charged.
2. The AG has a valid subscription number.
3. The AG and HF paired and connected.

Procedure:

1. Initiate an outgoing call from the AG.
2. Verify the uplink/downlink audio are at the HF.
3. Terminate the call at the remote party.

Expected Result: The HF call status indicators shall be reset after call completion. Check for visual or audio indication when the call is released.

2.3.2. AG Call Indicators Reset

2.3.2.1. After Calls – AG Call Indicators Reset (AG Terminate)

Requirements: HFP

Purpose: Validate the AG *Bluetooth* device resets call indicators after call completion.

Test Configuration:

1. Both the HF and AG batteries are charged.
2. AG has a valid subscription number.
3. AG and HF paired and connected.

Procedure:

1. Initiate an outgoing call from the AG.
2. Verify uplink/downlink audio are at the HF.
3. Terminate the call at the AG.

Expected Result: The AG call status indicators shall be reset after call completion.

2.3.2.2. After Calls – AG Call Indicators Reset (HF Terminate)

Requirements: HFP

Purpose: Validate the AG *Bluetooth* device resets call indicators after call completion.

Test Configuration:

1. Both the HF and AG batteries are charged.
2. AG has a valid subscription number.
3. AG and HF paired and connected.

Procedure:

1. Initiate an outgoing call from the AG.
2. Verify uplink/downlink audio are at the HF.
3. Terminate the call at the HF.

Expected Result: The AG call status indicators shall be reset after call completion.

2.3.2.3. After Calls – AG Call Indicators Reset (Remote Party Terminate)

Requirements: HFP

Purpose: Validate the AG *Bluetooth* device resets call indicators after call completion.

Test Configuration:

1. Both the HF and AG batteries are charged.
2. AG has a valid subscription number.
3. AG and HF paired and connected.

Procedure:

1. Initiate an outgoing call from the AG.
2. Verify uplink/downlink audio are at the HF.
3. Terminate the call at the remote party.

Expected Result: The AG call status indicators shall be reset after call completion.

2.4 Multi-Party Calling

2.4.1. Call Waiting

2.4.1.1. Call Waiting MT Call Answered

Requirements: HFP, AT+CHLD = 2

Purpose: Verify the device handling of call waiting.

Test Configuration:

1. Mobile device has a valid subscription with a carrier.
2. Both mobile device and the HF device have adequate battery power.
3. Mobile device is connected to the HF device via HFP profile.

Procedure:

1. Engage the device in a voice conversation.
2. Verify uplink and downlink audio exist on HF
3. Make an incoming call to the mobile.
4. Answer the call via the HF device.
5. Verify uplink and downlink audio exist on HF

Expected Result: The original call shall be placed on hold. The newly arrived MT call shall be active.

2.4.1.2. Call Swapped MT Call Answered

Requirements: HFP

Purpose: Verify the device handling of call swap.

Test Configuration:

1. Mobile device has a valid subscription with a carrier.
2. Both mobile device and the HF device have adequate battery power.
3. Mobile device is connected to the HF device via HFP profile.
4. The HF supports AT+CHLD = 2.

Procedure:

1. Engage the device in a voice conversation.
2. Make an incoming call to the mobile.
3. Verify that the HF provides an alert of the incoming call.
4. Answer the call via the HF device.
5. Toggle the calls via the HF device.

Expected Result: The original call shall be placed on hold. The newly arrived MT call shall be active. The two calls shall be toggled via the HF.

2.4.1.3. Call Swapped Active Party Drop

Requirements: HFP

Purpose: Verify the device handling of call swap.

Test Configuration:

1. Mobile device has a valid subscription with a carrier.
2. Both mobile device and HF device have adequate battery power.
3. Mobile device is connected to a HF device via HFP profile.
4. The HF supports call waiting.

Procedure:

1. Engage the device in a voice conversation.
2. Make an incoming call.
3. Answer the call via HF device.
4. Verify uplink and downlink audio exist on HF.
5. Toggle the calls via HF device.
6. Verify uplink and downlink audio exist on HF during the call.
7. Have the present active call party drop.
8. Verify the active call is switched to the call on hold (Initiated with user interaction or automatic) via HF or AG.
9. Verify uplink and downlink audio exist on HF.

Expected Result: The original call shall be put on hold. The newly arrived MT call shall be active. The two calls shall be toggled via the HF. One call dropped, line activates the call hold and retrieves the inactive call.

2.4.1.4. Waiting Call Rejected

Requirements: HFP

Purpose: Verify the device handling of call waiting.

Test Configuration:

1. Mobile device has a valid subscription with a carrier.
2. Both mobile device and the HF device have adequate battery power.
3. Mobile device is connected to the HF device via HFP profile.
4. The HF supports call waiting.

Procedure:

1. Establish a phone call.
2. Make a MT call to the mobile.
3. Verify that the HF provides an alert of the incoming call.
4. Reject/Ignore the call via the HF device using AT+CHLD=0, not AT+CHUP.
5. Verify the original call is kept active.

Expected Result: The newly arrived MT call shall be rejected. The original call shall be kept active.

2.4.2. 3-way Calling

2.4.2.1. GSM 3-way Calling

Requirements: HFP

Purpose: Verify the device handling of 3-way calling.

Test Configuration:

1. Mobile device has a valid subscription with a GSM carrier.

2. Both mobile device and the HF device have adequate battery power.
3. Mobile device is connected to the HF device via HFP profile.
4. The HF supports 3-way calling.

Procedure:

1. Engage the device in a voice conversation.
2. Make a MT call to the mobile.
3. Verify that the HF provides an alert of the incoming call.
4. Answer the call via the HF device.
5. Join the calls via the HF device to create a 3-way calling scenario.

Expected Result: The calls shall be joined as a 3-way call via the HF.

2.4.2.2. CDMA 3-way Calling

Requirements: HFP

Purpose: Verify the device handling of 3-way calling.

Test Configuration:

1. Mobile device has a valid subscription with a CDMA carrier.
2. Both the mobile device and HF device have adequate battery power.
3. Mobile device is connected to the HF device via HFP profile.
4. The HF supports 3-way calling.

Procedure:

1. Engage the AG in a voice conversation.
2. Originate a second call.
3. Verify that the HF provides an alert of the incoming call.
4. Join the calls via HF device to create a 3-way calling scenario.

Expected Result: The calls shall be joined as a 3-way call via HF device.

2.5 Audio Management

2.5.1. Audio Level Control

2.5.1.1. Volume Control – From HF (Vol+)

Requirements: HFP

Purpose: Validate volume can be adjusted up and down from the HF after *Bluetooth* devices paired and connected.

Test Configuration:

1. Both the HF and AG batteries are charged.
2. The AG has a valid subscription number.
3. The AG and HF are paired and connected.
4. The HF supports volume control functions.

Procedure:

1. Initiate an outgoing call from the AG.
2. Verify uplink/ downlink audio are at the HF.

3. From the HF, adjust the volume up using the volume key(s).

Expected Result: The HF downlink volume shall be increased.

2.5.1.2. Volume Control – From HF (Vol-)

Requirements: HFP

Purpose: Validate volume can be adjusted up and down from the HF after *Bluetooth* devices paired and connected.

Test Configuration:

1. Both the HF and AG batteries are charged.
2. The AG has a valid subscription number.
3. The AG and HF are paired and connected.
4. The HF supports volume control functions.

Procedure:

1. Initiate an outgoing call from the AG.
2. Verify uplink/downlink audio are at the HF.
3. From the HF, adjust the volume down using the volume key(s).

Expected Result: The HF downlink volume shall be decreased.

2.5.1.3. Volume Control – From AG (Vol+)

Requirements: HFP

Purpose: Validate volume can be adjusted up and down from the AG after *Bluetooth* devices paired and connected.

Test Configuration:

1. Both the HF and AG batteries are charged.
2. The AG has a valid subscription number.
3. The AG and HF paired and connected.

Procedure:

1. Initiate an outgoing call from the AG.
2. Verify uplink/downlink audio are at the HF.
3. From the AG, adjust volume up..
4. Verify the volume adjusted accordingly.

Expected Result: The HF downlink volume shall be increased.

2.5.1.4. Volume Control – From AG (Vol-)

Requirements: HFP

Purpose: Validate volume can be adjusted up and down from the AG after *Bluetooth* devices paired and connected.

Test Configuration:

1. Both the HF and AG batteries are charged.

2. The AG has a valid subscription number.
3. The AG and HF paired and connected.

Procedure:

1. Initiate an outgoing call from the AG.
2. Verify uplink/ downlink audio are at the HF.
3. From the AG, adjust volume down
4. Verify the volume adjusted accordingly.

Expected Result: The HF downlink volume shall be decreased.

2.5.2. Audio Transfer

2.5.2.1. Audio Transfer From HF to AG, Initiated by HF

Requirements: HFP, HF has capability to transfer audio without powering off.

Purpose: Verify that the HF device can successfully transfer audio from the HF to the AG.

Test Configuration:

1. The HF and AG are paired and in an active call per procedure defined in Hands-Free Profile.
2. The AG is in an active call with the HF with audio routed to the HF.

Procedure:

1. Initiate the action (device specific) on the HF to remove the audio connection with the AG.

Expected Result: Audio for active call (Uplink and Downlink) shall be on the AG. No audio shall be present on the HF device.

2.5.2.2. Audio Transfer From HF to AG, Initiated by HF via power down.

Requirements: HFP, HF has capability to transfer audio by powering down the HF device.

Purpose: Verify that the HF device can successfully transfer audio from the HF to the AG by powering down the HF device.

Test Configuration:

1. The HF and AG are paired and in an active call per procedure defined in Hands-Free Profile.
2. The AG is in an active call with the HF with the audio routed to the HF.

Procedure:

1. Power down the HF (per manufacturer's specification).
2. Verify full duplex audio is available on the AG.

Expected Result: Audio for active call (Uplink and Downlink) shall be on the AG.

2.5.2.3. Audio Transfer From AG to HF, Initiated by HF

Requirements: HFP

Purpose: Verify that the HF device can successfully transfer audio from the AG to the HF.

Test Configuration:

1. The HF and AG are paired and in an active call per procedure defined in Hands-Free Profile.
2. The AG is in an active call with the HF with the audio routed to the AG.

Procedure:

1. Initiate the action (device specific) on the HF to establish and the audio connection with the AG.

Expected Result: Audio for active call (Uplink and Downlink) shall be on the HF device. No audio shall be present on the AG.

2.5.2.4. Audio Transfer From AG to HF, Initiated by AG

Requirements: HFP

Purpose: Verify that the AG device can successfully transfer audio from the AG to the HF.

Test Configuration:

1. The HF and AG are paired and in an active call per procedure defined in Hands-Free Profile.
2. The AG is in an active call with the audio routed to the AG.

Procedure:

1. Initiate the action (device specific) on the AG to establish and the audio connection with the HF.

Expected Result: Audio for active call (Uplink and Downlink) shall be on the HF device. No audio shall be present on the AG.

2.5.2.5. Audio Transfer From HF to AG, Initiated by AG

Requirements: HFP

Purpose: Verify that the AG device can successfully transfer audio from the HF to the AG.

Test Configuration:

1. The HF and AG are paired and in an active call per procedure defined in Hands-Free Profile.
2. The AG is in an active call with the HF with full duplex audio.

Procedure:

1. Initiate the action (device specific) on the AG to remove and the audio connection with the HF.

Expected Result: Audio for active call (Uplink and Downlink) shall be on the AG device. No audio shall be present on the HF.

2.5.3. eSCO

2.5.3.1. Both Devices Support eSCO Connection

Requirements: HFP

Purpose: Validate both devices connect using Enhanced SCO connection.

Test Configuration:

1. The AG has the capabilities to make phone calls.
2. The battery power is good on both devices.
3. Both the AG and HF support eSCO for this test case to be applicable.
4. Monitor the link with an OTA sniffer.

Procedure:

1. Start a service level connection with the HF (supporting eSCO) by pairing the AG with the HF.
2. Open a voice (eSCO) channel to the HF by placing call from the AG.
3. Verify that the voice channel uses an eSCO connection.
4. Transfer the call audio from the HF to the AG initiated by the AG.
5. Transfer the call audio from the AG to the HF initiated by the HF.
6. Verify that the voice channel uses an eSCO connection.

Expected Result: The voice channel shall be successfully maintained using an eSCO connection for two minutes.

2.6 Disconnection/Reconnection

2.6.1. Out of Range Reconnection

2.6.1.1. Out of Range Reconnection during Idle Mode, HF

Requirements: HFP

Purpose: Validate proper HFP disconnection detection and reconnection following an out of range event during idle mode.

Test Configuration:

1. The AG and HF are paired and connected.

Procedure:

1. Take the HF out of the range of the AG.
2. Verify that the AG shows disconnection from the HF within 30 seconds.
3. Bring the HF back into range of the AG.
4. Wait 30 seconds and verify that the AG shows connection to the HF, if not automatically connected, attempt to connect from the HF without power cycling the HF.
5. Make a call to the AG.
6. Answer the call from the HF to verify HFP functionality, uplink and downlink audio on the HF.

Expected Result:

1. AG should indicate disconnection from the HF within 30 seconds.
2. HF functionality should be restored automatically or manually.

3. HF should be able to answer the incoming call.
4. Call audio (uplink and downlink) should be present on the HF.

2.6.1.2. Out of Range Reconnection during a Call

Requirements: HFP

Purpose: Validate proper HFP disconnection detection and reconnection following an out of range event during a call.

Test Configuration:

1. The AG and HF are paired and connected.

Procedure:

1. Engage in a call with uplink and downlink audio on the HF.
2. Take the HF out of the range of the AG.
3. Verify that the AG shows disconnection from the HF within 30 seconds.
4. Call audio should be routed to the AG automatically or manually.
5. Bring the HF back into range of the AG.
6. Wait 30 seconds and verify that the AG shows connection to the HF, if not automatically connected, attempt to connect from the HF without power cycling the HF.
7. If call audio is not automatically transferred to the HF, initiate audio transfer from the HF
8. Verify that the call uplink and downlink audio resume on the HF and that the call could be terminated from the HF.

Expected Result:

1. AG should indicate disconnection from the HF within 30 seconds.
2. HF functionality should be restored automatically or manually.
3. Call audio (uplink and downlink) should be present on the HF.
4. HF Should be able to end the call.

2.6.2. Power Cycle Reconnection

2.6.2.1. Power Cycle Reconnection during a Call

Requirements: HFP

Purpose: Validate proper HFP disconnection detection and reconnection following an HF power cycle during a call.

Test Configuration:

1. The AG and HF are paired and connected.

Procedure:

1. Engage in a call with uplink and downlink audio on the HF.
2. Power down the HF.
3. Verify that the AG shows disconnection to the HF within 30 seconds.
4. If not done automatically by the AG route the call audio to the AG.
5. Power on the HF.
6. Wait 30 seconds and verify that the AG shows connection to the HF.

7. If call audio is not automatically transferred to the HF initiate audio transfer from the HF.
8. Verify that the call uplink and downlink audio resume on the HF and that the call could be terminated from the HF.

Expected Result:

1. AG should indicate disconnection from the HF within 30 seconds.
2. HF functionality should be restored automatically.
3. Call audio (uplink and downlink) should be present on the HF.

Section 3 Stereo Audio Validation

3.1 Connection Management

3.1.1. Disconnection

3.1.1.1. Disconnect From SRC

Requirements: A2DP

Purpose: Validate a *Bluetooth* device can be disconnected from SRC.

Test Configuration:

1. The SRC and SNK batteries are charged.
2. The SRC and SNK are paired and connected.
3. The SRC and SNK devices are in idle mode.

Procedure:

1. From the SRC perform a disconnect *Bluetooth* SNK device.
2. Verify the SNK device is disconnected by playing music on the device and verify the audio is routed to the device.

Expected Result: The SRC and SNK shall be disconnected.

3.1.1.2. Disconnect From SNK

Requirements: A2DP, AVRCP

Purpose: Validate a *Bluetooth* device can be disconnected from SNK.

Test Configuration:

1. The SRC and SNK batteries are charged.
2. The SRC and SNK are paired and connected.
3. The SRC and SNK devices are in idle mode.

Procedure:

1. From the SNK perform a disconnect *Bluetooth* device (e.g.Power off SNK device).
2. Verify the SNK device is disconnected by playing music on the device and verify the audio is routed to the device.

Expected Result: The SRC and SNK shall be disconnected.

3.2 Control

3.2.1. From SRC

3.2.1.1. Play – SRC

Requirements: A2DP

Purpose: To verify that music playback re-starts after being stopped.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is on stopped state, playback application is active.
3. User has either selected Stop or has just created a connection between devices and has not yet started to listen to music.

Procedure:

1. Select Play from the SRC.

Expected Result: Music playback should start.

3.2.1.2. Pause – Resume – SRC

Requirements: A2DP

Purpose: To verify that music playback continues, after Pause.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Select Pause from SRC.
2. Select Play (resume) after a few seconds from SRC.

Expected Result: Music playback should pause. Once Play is selected Music playback should continue from the point of pause.

3.2.1.3. Stop – SRC

Requirements: A2DP

Purpose: To verify that Music playback Stops.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Select Stop from the SRC. This may require exiting the media player.
2. Initiate action on the phone to restart audio streaming (to verify Stop didn't create disconnection).

Expected Result: Music playback shall stop. Once play is selected, playback shall continue at the point of stop or the beginning of the track.

3.2.1.4. Local Volume + Ctrl. From SRC 1

Requirements: A2DP. SRC supports local volume control

Purpose: To verify that music playback volume changes correctly.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Press the Vol + at the SRC.

Expected Result: Volume change shall be audible.

3.2.1.5. Local Volume – Ctrl. From SRC 1

Requirements: A2DP. SRC supports local volume control

Purpose: To verify that music playback volume changes correctly.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Press the Vol – at the SRC.

Expected Result: Volume change shall be audible.

3.2.1.6. Local Volume + Ctrl. From SRC 2

Requirements: A2DP. SRC supports local volume control

Purpose: To verify that music playback volume changes correctly.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Press the Vol + at the SRC multiple times.

Expected Result: Volume change shall be done smoothly (i.e. without any leaps or delays).

3.2.1.7. Local Volume – Ctrl. From SRC 2

Requirements: A2DP. SRC supports local volume control

Purpose: To verify that music playback volume changes correctly.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Press the Vol – at the SRC multiple times.

Expected Result: Volume change shall be done smoothly (i.e. without any leaps or delays).

3.2.1.8. Local Volume + Ctrl. From SRC 3

Requirements: A2DP. SRC supports local volume control

Purpose: To verify that music playback volume changes correctly.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Press the Vol + key at the SRC until max level is reached.

Expected Result: SRC or SNK indication when max level is reached.

3.2.1.9. Local Volume – Ctrl. From SRC 3

Requirements: A2DP. SRC supports local volume control

Purpose: To verify that music playback volume changes correctly.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Press the Vol – key at the SRC until min level is reached.

Expected Result: SRC or SNK indication when min level is reached.

3.2.1.10. AVRCP Volume + Ctrl. From SRC 1

Requirements: A2DP, SRC supports AVRCP-CT Cat2 Volume up/down AND SNK supports AVRCP-TG Cat2 Volume up/down

Purpose: To verify that music playback volume changes correctly.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Press the Vol + at the SRC.

Expected Result: Volume change shall be audible.

3.2.1.11. AVRCP Volume – Ctrl. From SRC 1

Requirements: A2DP, SRC supports AVRCP-CT Cat2 Volume up/down AND SNK supports AVRCP-TG Cat2 Volume up/down

Purpose: To verify that music playback volume changes correctly.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Press the Vol – at the SRC.

Expected Result: Volume change shall be audible.

3.2.1.12. AVRCP Volume + Ctrl. From SRC 2

Requirements: A2DP, SRC supports AVRCP-CT Cat2 Volume up/down AND SNK supports AVRCP-TG Cat2 Volume up/down

Purpose: To verify that music playback volume changes correctly.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Press the Vol + at the SRC multiple times.

Expected Result: Volume change shall be done smoothly (i.e. without any leaps or delays).

3.2.1.13. AVRCP Volume – Ctrl. From SRC 2

Requirements: A2DP, SRC supports AVRCP-CT Cat2 Volume up/down AND SNK supports AVRCP-TG Cat2 Volume up/down

Purpose: To verify that music playback volume changes correctly.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Press the Vol – at the SRC multiple times.

Expected Result: Volume change shall be done smoothly (i.e. without any leaps or delays).

3.2.1.14. AVRCP Volume + Ctrl. From SRC 3

Requirements: A2DP, SRC supports AVRCP-CT Cat2 Volume up/down AND SNK supports AVRCP-TG Cat2 Volume up/down

Purpose: To verify that music playback volume changes correctly.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Press the Vol + key at the SRC until max level is reached.

Expected Result: SRC or SNK indication when max level is reached.

3.2.1.15. AVRCP Volume – Ctrl. From SRC 3

Requirements: A2DP, SRC supports AVRCP-CT Cat2 Volume up/down AND SNK supports AVRCP-TG Cat2 Volume up/down

Purpose: To verify that music playback volume changes correctly.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Press the Vol – key at the SRC until min level is reached.

Expected Result: SRC or SNK indication when min level is reached.

3.2.2. From SNK

3.2.2.1. Play - SNK

Requirements: AVRCP, A2DP

Purpose: To verify that music playback re-starts after being stopped.

Test Configuration:

1. Music playback is on stopped state, playback application is active.
2. User has either selected Stop or has just created a connection between devices and has not yet started to listen to music.

Procedure:

1. Select Play from SNK.

Expected Result: Music playback should start.

3.2.2.2. Pause – Resume - SNK

Requirements: AVRCP, A2DP

Purpose: To verify that music playback continues after Pause.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Select Pause from SNK.
2. Select Play (resume) after a few seconds from SNK.

Expected Result: Music playback should pause. Once Play is selected Music playback should continue from the point of pause.

3.2.2.3. Stop – SNK

Requirements: AVRCP, A2DP

Purpose: To verify that music playback stops.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Select Stop from the SNK.
2. Verify music stops.
3. Select Play from the SNK
4. Verify music starts.

Expected Result: Playback shall continue at the point of stop or the beginning of the track.

3.2.2.4. Local Volume + Ctrl. From SNK 1

Requirements: A2DP. SNK supports local volume control

Purpose: To verify that music playback volume changes correctly.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Press the Vol + key at the SNK.

Expected Result: Volume change shall be audible.

3.2.2.5. Local Volume - Ctrl. From SNK 1

Requirements: A2DP. SNK supports local volume control

Purpose: To verify that music playback volume changes correctly.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure: Press the Vol - key at the SNK.

Expected Result: Volume change shall be audible.

3.2.2.6. Local Volume + Ctrl. From SNK 2

Requirements: A2DP. SNK supports local volume control

Purpose: To verify that music playback volume changes correctly.

Test Configuration: The SRC is paired and connected to a SNK. Music playback is ongoing over the A2DP channel.

Procedure:
1. Press the Vol + at the SNK multiple times.

Expected Result: Volume change shall be done smoothly (i.e. without any leaps or delays).

3.2.2.7. Local Volume - Ctrl. From SNK 2

Requirements: A2DP. SNK supports local volume control

Purpose: To verify that music playback volume changes correctly.

Test Configuration:
1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:
1. Press the Vol - at the SNK multiple times.

Expected Result: Volume change shall be done smoothly (i.e. without any leaps or delays).

3.2.2.8. Local Volume + Ctrl. From SNK 3

Requirements: A2DP. SNK supports local volume control

Purpose: To verify that Music playback Volume changes correctly.

Test Configuration:
1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:
1. Press the Vol + key at the SNK until max level is reached.

Expected Result: The SNK volume shall change to the maximum level.

3.2.2.9. Local Volume - Ctrl. From SNK 3

Requirements: A2DP. SNK supports local volume control

Purpose: To verify that Music playback Volume changes correctly.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Press the Vol - key at the SNK until min level is reached.

Expected Result: The SNK volume shall change to the minimum level.

3.2.2.10. AVRCP Volume + Ctrl. From SNK 1

Requirements: A2DP, SRC supports AVRCP-TG Cat2 Volume up/down AND SNK supports AVRCP-CT Cat2 Volume up/down

Purpose: To verify that music playback volume changes correctly.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Press the Vol + key at the SNK.

Expected Result: Volume change shall be audible.

3.2.2.11. AVRCP Volume - Ctrl. From SNK 1

Requirements: A2DP, SRC supports AVRCP-TG Cat2 Volume up/down AND SNK supports AVRCP-CT Cat2 Volume up/down

Purpose: To verify that music playback volume changes correctly.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Press the Vol - key at the SNK.

Expected Result: Volume change shall be audible.

3.2.2.12. AVRCP Volume + Ctrl. From SNK 2

Requirements: A2DP, SRC supports AVRCP-TG Cat2 Volume up/down AND SNK supports AVRCP-CT Cat2 Volume up/down

Purpose: To verify that music playback volume changes correctly.

Test Configuration:

1. The SRC is paired and connected to a SNK.

2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Press the Vol + at the SNK multiple times.

Expected Result: Volume change shall be done smoothly (i.e. without any leaps or delays).

3.2.2.13. AVRCP Volume - Ctrl. From SNK 2

Requirements: A2DP, SRC supports AVRCP-TG Cat2 Volume up/down AND SNK supports AVRCP-CT Cat2 Volume up/down

Purpose: To verify that music playback volume changes correctly.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Press the Vol - at the SNK multiple times.

Expected Result: Volume change shall be done smoothly (i.e. without any leaps or delays).

3.2.2.14. AVRCP Volume + Ctrl. From SNK 3

Requirements: A2DP, SRC supports AVRCP-TG Cat2 Volume up/down AND SNK supports AVRCP-CT Cat2 Volume up/down

Purpose: To verify that Music playback Volume changes correctly.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Press the Vol + key at the SNK until max level is reached.

Expected Result: The SNK volume shall change to the maximum level.

3.2.2.15. AVRCP Volume - Ctrl. From SNK 3

Requirements: A2DP, SRC supports AVRCP-TG Cat2 Volume up/down AND SNK supports AVRCP-CT Cat2 Volume up/down

Purpose: To verify that Music playback Volume changes correctly.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Press the Vol - key at the SNK until min level is reached.

Expected Result: The SNK volume shall change to the minimum level.

3.3 Navigation

3.3.1. From SRC

3.3.1.1. Next Track – SRC (One Track Music Playing)

Requirements: A2DP

Purpose: To verify that music playback continues, from selected next track.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Must not be playing last track in playlist.
3. Music playback is ongoing over the A2DP channel.

Procedure:

1. Select next track from the SRC.

Expected Result: Playback for the next track should be started on the SNK.

3.3.1.2. Next Track – SRC (One Track Music Paused)

Requirements: A2DP

Purpose: To verify that the next track is selected when the music is paused.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Select pause from SRC. Select Next track from the SRC.

Expected Result: When next track is selected the track should change to next one. Playback may or may not start automatically.

3.3.1.3. Next Track – SRC (Multiple Tracks Music Playing)

Requirements: A2DP

Purpose: To verify that music playback continues, from selected next track.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Select next track from SRC several times, i.e. jump over a few tracks.

Expected Result: Playback should continue on the SNK from the track that the user selected.

3.3.1.4. Next Track – SRC (Multiple Tracks Music Paused)

Requirements: A2DP

Purpose: To verify that music playback continues, from selected next track.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Select pause from the SRC.
2. Select next track from SRC several times, i.e. jump over a few tracks.

Expected Result: The SRC should advance to the track the user selected. Playback may or may not start automatically.

3.3.1.5. FF – SRC

Requirements: A2DP

Purpose: To verify that music playback continues, and from the new position(s) after Fast Forwarding.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Select FF from the SRC (Per manufacturers specification)

Expected Result: The music shall fast forward like the device would without *Bluetooth* wireless technology connected.

3.3.1.6. Previous Track – SRC (Music Playing)

Requirements: A2DP

Purpose: To verify that music playback continues, and from selected previous track.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Select previous track from the SRC.

Expected Result: Playback for the previous track should start or playback should start at the beginning of the current track.

3.3.1.7. Previous Track – SRC (Music Paused)

Requirements: A2DP

Purpose: To verify that music playback continues, and from selected previous track.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Select pause at the SRC.
2. Select previous track from the SRC.

Expected Result: The track should be changed to previous one or the start of the current track.

3.3.1.8. Previous Track – SRC (Multiple Tracks Music Playing)

Requirements: A2DP

Purpose: To verify that music playback continues, and from selected previous track.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Select previous track from the phone several times, i.e. jump over a few tracks.

Expected Result: Playback shall continue from the track user selected.

3.3.1.9. Previous Track – SRC (Multiple Tracks Music Paused)

Requirements: A2DP

Purpose: To verify that music playback continues, and from selected previous track.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Select Pause from the SRC.
2. Select Previous track from the phone several times, i.e. jump over a few tracks.

Expected Result: Playback shall continue from the track the user selected. Playback may or may not start automatically.

3.3.1.10. REW – SRC

Requirements: A2DP

Purpose: To verify that music playback continues, and from the new position(s) after Rewind

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Select REW from the SRC (Per manufacturer's specifications).

Expected Result: The music shall rewind like the device would without *Bluetooth* wireless technology connected.

3.3.1.11. REW – SRC (Beginning of Track)

Requirements: A2DP

Purpose: To verify that music playback continues from the new position(s) after Rewind

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Select REW from the SRC rewinding to the beginning of the track.

Expected Result: The music track shall rewind like using the device without *Bluetooth* wireless technology connected.

3.3.2. From SNK

3.3.2.1. Next Track – SNK (Music Playing)

Requirements: AVRCP, A2DP

Purpose: To verify that music playback continues, from selected next track.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Select Next track from SNK.

Expected Result: Playback for the next track should start.

3.3.2.2. Next Track – SNK (Music Paused)

Requirements: AVRCP, A2DP

Purpose: To verify that music playback continues, from selected next track.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Select Pause from the SNK.
2. Select Next track from SNK.

Expected Result: When next track is selected the track should change to next track. Playback may or may not start automatically.

3.3.2.3. Next Track - SNK (Multiple Tracks Music Playing)

Requirements: AVRCP, A2DP

Purpose: To verify that music playback continues, from selected next track.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Select Next track from SNK several times, i.e. jump over a few tracks.

Expected Result: Playback shall continue from the track user selected. Playback may or may not start automatically.

3.3.2.4. Next Track - SNK (Multiple Tracks Music Paused)

Requirements: AVRCP, A2DP

Purpose: To verify that music playback continues, from selected next track.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Pause the music at the SNK.
2. Select Next track from SNK several times, i.e. jump over a few tracks.

Expected Result: Playback should continue from the track user selected.

3.3.2.5. FF - SNK

Requirements: AVRCP, A2DP

Purpose: To verify that music playback continues, and from the new position(s) after Fast Forwarding.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Select FF from the SNK (Per manufacturers specification)

Expected Result: The music shall fast forward like the device would without *Bluetooth* wireless technology connected.

3.3.2.6. Previous Track – SNK (Music Playing)

Requirements: AVRCP, A2DP

Purpose: To Verify that Music playback continues, and from selected previous track.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback ongoing over the A2DP channel.

Procedure:

1. Select previous track from the SNK.

Expected Result: Playback for the previous track shall start.

3.3.2.7. Previous Track – SNK (Music Paused)

Requirements: AVRCP, A2DP

Purpose: To Verify that Music playback continues, and from selected previous track.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Select Pause from the SNK.
2. Select previous track from the SNK.

Expected Result: Playback for the previous track shall start or playback should start at the beginning of the current track. Playback may or may not start automatically.

3.3.2.8. Previous Track - SNK (Multiple Tracks Music Playing)

Requirements: AVRCP, A2DP

Purpose: To verify that music playback continues, and from selected previous track.

Test Configuration:

1. The SRC is paired and connected to a SNK.
2. Music playback is ongoing over the A2DP channel.

Procedure:

1. Select previous track from SNK several times, i.e. jump over a few tracks.

Expected Result: Playback shall continue from the track user selected.

3.3.2.9. Previous Track - SNK (Multiple Tracks Music Paused)

- Requirements: AVRCP, A2DP
- Purpose: To verify that music playback continues, and from selected previous track.
- Test Configuration:
1. The SRC is paired and connected to a SNK.
 2. Music playback is ongoing over the A2DP channel.
- Procedure:
1. Select Pause from the SNK.
 2. Select previous track from SNK several times, i.e. jump over a few tracks.
- Expected Result: Playback shall continue from the track user selected. Playback may or may not start automatically.

3.3.2.10. REW – SNK

- Requirements: AVRCP, A2DP
- Purpose: To verify that music playback continues, and from the new position(s) after Rewind.
- Test Configuration:
1. The SRC is paired and connected to a SNK.
 2. Music playback is ongoing over the A2DP channel.
- Procedure:
1. Select REW from the SNK (Per manufacturer's specifications).
- Expected Result: The music shall rewind like the device would without *Bluetooth* wireless technology connected.

3.3.2.11. REW – SNK (Beginning of Track)

- Requirements: AVRCP, A2DP
- Purpose: To verify that music playback continues from the new position(s) after Rewind
- Test Configuration:
1. The SRC is paired and connected to a SNK.
 2. Music playback is ongoing over the A2DP channel.
- Procedure:
1. Select REW from the SNK rewinding to the beginning of the track.
- Expected Result: The music track shall rewind like using the device without *Bluetooth* wireless technology connected.

Section 4 Phonebook Transfer Validation

4.1 Phone Book Access Profile

4.1.1. Download

4.1.1.1. Contact List Transfer Using PBAP

Requirements: PBAP

Purpose: Verify that contact lists can be transferred from the device to the PCE.

Test Configuration:

1. PSE and PCE have been paired and have established a PBAP session.
2. The PSE should have more than 10 entries in the phonebook.
3. The PCE should have no entries in it.
4. Both devices support PBAP.

Procedure:

1. From the PCE initiate a request to download the phonebook from the PSE.

Expected Result: The phonebook shall be transferred from the PSE to the PCE, and shall match the entries in the phone if the field is supported.

4.1.2. Browse

4.1.2.1. Contact List Browse Using PBAP

Requirements: PBAP

Purpose: To verify that contact lists can be browsed from the PCE to the PSE.

Test Configuration:

1. PSE and PCE have been paired and have established a PBAP session.
2. The PSE should have more than 10 entries in the phonebook.
3. The PCE should have no entries in it. Both devices support PBAP.

Procedure:

1. From the PCE initiate a request to browse the phonebook for a contact.

Expected Result: The desired entry shall be transferred from the PSE to the PCE, and shall be complete.

4.1.3. Selection

4.1.3.1. Phonebook Selection Using PBAP

Requirements: PBAP

Purpose: To verify that the PBAP client (PCE) can select either phonebook if the device has multiple phonebooks.

Test Configuration:

1. PSE and PCE have been paired and have established a PBAP session.
2. The PSE should have more than 10 entries in the each phonebook (eg. The second phonebook is contained on a SIM card).
3. The PCE should have no entries in it.
4. Both devices support PBAP

Procedure:

1. From the PCE, select the primary phonebook and download an entry.
2. After verifying the proper download, switch to the alternative phonebooks and retry downloading.

Expected Result: The information transferred shall be from the correct phonebook.

4.2 Object Push Profile

4.2.1. Single Contact

4.2.1.1. Phonebook Entry Transfer by OPP

Requirements: OPP

Purpose: Verify that the client and server can pass a single phonebook entry.

Test Configuration:

1. Client and Server have been paired have established an OPP session.
2. The Client should have more than 10 entries in the phonebook.
3. The Server should have no entries in it.

Procedure:

1. From the client select a single phonebook entry and send the entry to the server.

Expected Result: The server shall have the correct phonebook entry.

4.2.2. Multiple Contacts

4.2.2.1. Multiple Phonebook Entry Transfers by OPP

Requirements: OPP

Purpose: Verify that the client and server can pass a multiple phonebook entry.

Test Configuration:

1. Client and server have been paired have established an OPP session.
2. The client should have more than 10 entries in the phonebook.
3. The server should have no entries in it.

Procedure:

1. From the client select a multiple phonebook entry and send the entries to the server.

Expected Result: The server shall have the correct phonebook entries. It is acceptable to use a single or multiple connections to transfer the contacts.

4.2.2.2. Phonebook Entry Transfer by OPP (Entire Phone Book)

Requirements: OPP

Purpose: Verify that the client and server can pass a phonebook from the client to the server.

Test Configuration:

1. Client and server have been paired have established an OPP session.
2. The client should have more than 10 entries in the phonebook.
3. The server should have no entries in it.

Procedure:

1. From the client select the phonebook and send the whole phonebook to the server.

Expected Result: The server shall have the correct phonebook, and display them correctly. It is acceptable to use a single or multiple connections to transfer the contacts.

Section 5 Multi Profile Validation

5.1 Messaging

5.1.1. SMS while Playing Music

5.1.1.1. Receive SMS (Playing Music)

Requirements: HFP, A2DP

Purpose: Validate that a SMS is received while playing music.

Test Configuration:

1. The device must be paired to a stereo *Bluetooth* stereo accessory.

Procedure:

1. Play music from the device.
2. While the device is playing music send a text message to the device.
3. Verify the text message is received.

Expected Result: Audio over the A2DP channel shall be present after the text message is received regardless if there is an alert tone or not.

5.2 Call Processing

5.2.1. Incoming Call with Media

5.2.1.1. Call + Music Interaction (Call Rejected From Stereo Accessory)

Requirements: HFP, A2DP, AVRCP

Purpose: Verify that music resumes over A2DP after incoming call is rejected from *Bluetooth* stereo accessory.

Test Configuration:

1. The device must be paired to a stereo *Bluetooth* stereo accessory.

Procedure:

1. Connect the phone to the stereo accessory over HFP and A2DP profiles.
2. Start streaming music over A2DP to the stereo accessory.
3. Make incoming call to the phone.
4. Verify that the HF provides an alert of the incoming call.
5. When call indication occurs on stereo accessory, reject the call from the stereo accessory.

Expected Result: After call has been rejected, the music shall resume playing over A2DP *Bluetooth* link, note time.

5.2.1.2. Call + Music Interaction (Call Rejected From Phone)

Requirements: HFP, A2DP, AVRCP

Purpose: Verify that music resumes over A2DP after incoming call is rejected from the phone.

Test Configuration:

1. The device must be paired to a stereo *Bluetooth* stereo accessory.

Procedure:

1. Connect the phone to the stereo accessory over HFP and A2DP profiles.
2. Start streaming music over A2DP to the stereo accessory.
3. Make incoming call to the phone.
4. Verify that the HF provides an alert of the incoming call.
5. When call indication occurs on stereo accessory, reject the call from the phone.

Expected Result: After call has been rejected, the music shall resume playing over A2DP *Bluetooth* link, note time.

5.2.1.3. Call + Music Interaction (Call Ignored)

Requirements: HFP, A2DP, AVRCP

Purpose: Verify that music resumes over A2DP after incoming call is ignored.

Test Configuration:

1. The device must be paired to a stereo *Bluetooth* stereo accessory.

Procedure:

1. Connect the phone to the stereo accessory over HFP and A2DP profiles.
2. Start streaming music over A2DP to the stereo accessory.
3. Make incoming call to the phone.
4. Verify that the HF provides an alert of the incoming call.
5. When call indication occurs on stereo accessory, make no user action from the phone.

Expected Result: After call indication is complete, the music shall resume playing over A2DP *Bluetooth* link, note time.

5.2.1.4. Call + Music Interaction (Call Answered From Stereo Accessory)

Requirements: HFP, A2DP, AVRCP

Purpose: Verify that music resumes over A2DP after call ends.

Test Configuration:

1. The device must be paired to a stereo *Bluetooth* stereo accessory.

Procedure:

1. Connect the phone to the stereo accessory over HFP and A2DP profiles.
2. Start streaming music over A2DP to the stereo accessory.
3. Make incoming call to the phone.
4. Verify that the HF provides an alert of the incoming call.

5. When call indication occurs on stereo accessory, answer the call on the stereo accessory.
6. End the call from the stereo accessory.

Expected Result: After call ends, the music shall resume playing over A2DP *Bluetooth* link, note time.

5.2.1.5. Call + Music Interaction (Call Answered From Phone)

Requirements: HFP, A2DP, AVRCP

Purpose: Verify that music resumes over A2DP after call ends.

Test Configuration:

1. The device must be paired to a stereo *Bluetooth* stereo accessory.

Procedure:

1. Connect the phone to the stereo accessory over HFP and A2DP profiles.
2. Start streaming music over A2DP to the stereo accessory.
3. Make incoming call to the phone.
4. Verify that the HF provides an alert of the incoming call.
5. When call indication occurs on stereo accessory, answer the call on the phone.
6. End the call from the phone.

Expected Result: After call ends, the music shall resume playing over A2DP *Bluetooth* link, note time.

5.2.1.6. Call + Music Interaction (Call Answered From Phone, Ended by Remote Device)

Requirements: HFP, A2DP, AVRCP

Purpose: Verify that music resumes over A2DP after call ends.

Test Configuration:

1. The device must be paired to a stereo *Bluetooth* stereo accessory.

Procedure:

1. Connect the phone to the stereo accessory over HFP and A2DP profiles.
2. Start streaming music over A2DP to the stereo accessory.
3. Make incoming call to the phone.
4. Verify that the HF provides an alert of the incoming call.
5. When call indication occurs on stereo accessory, answer the call on the phone.
6. End the call from the remote phone.

Expected Result: After call ends, the music shall resume playing over A2DP *Bluetooth* link, note time.

5.2.2. Outgoing Call with Media

5.2.2.1. Call + Music Interaction (Outgoing Call Initiated From Phone-Music Stopped)

Requirements: HFP, A2DP

Purpose: Verify that streaming can be stopped in order to place an outgoing call from the phone.
Verify that streaming can be started after the call is ended.

Test Configuration:

1. The device must be paired to a *Bluetooth* stereo accessory.

Procedure:

1. Connect the phone to the stereo accessory over HFP and A2DP profiles.
2. Start streaming music over A2DP to the stereo accessory.
3. Stop or exit audio streaming from the phone. This may require to exit the media player.
4. Place an outgoing call from the phone and verify uplink and downlink audio is present at the HF.
5. End the call from the HF.
6. Initiate action on the phone to restart audio streaming, if this did not occur automatically.

Expected Result: An outgoing call with uplink and downlink audio can be originated from the phone after streaming was stopped or exited from the phone. A2DP audio streaming can be restarted following the call termination. Music playback may start at the point of stop or the beginning of the track.

5.2.2.2. Call + Music Interaction (Outgoing Call Initiated From Phone-Music Paused)

Requirements: HFP, A2DP

Purpose: Verify that streaming can be paused in order to place an outgoing call from the phone.
Verify that streaming can be resumed after the call is ended.

Test Configuration:

1. The device must be paired to a *Bluetooth* stereo accessory.

Procedure:

1. Connect the phone to the stereo accessory over HFP and A2DP profiles.
2. Start streaming music over A2DP to the stereo accessory.
3. Pause audio streaming from the phone.
4. Place an outgoing call from the phone and verify uplink and downlink audio is present at the HF.
5. End the call from the HF.
6. Initiate action on the phone to resume audio streaming, if this did not occur automatically.

Expected Result: An outgoing call with uplink and downlink audio can be originated from the phone after streaming was paused from the phone. A2DP audio streaming can be resumed following the call termination. Music playback should continue from the point of pause.

5.3 Disconnection/Reconnection

5.3.1. Out of Range Reconnection

5.3.1.1. Out of Range Reconnection during Idle Mode, Multi Profile Accessory

Requirements: HFP, A2DP, AVRCP

Purpose: Validate proper multiple profiles disconnection detection and reconnection following an out of range event during idle mode.

Test Configuration:

1. The device and accessory are paired and connected.

Procedure:

1. Take the accessory out of the range of the device.
2. Verify that the device shows disconnection to the accessory within 30 seconds.
3. Bring the accessory back in the range of the device.
4. Wait 30 seconds and verify that the device shows connection to the accessory, if not automatically connected, attempt to connect from the accessory without power cycling the accessory.
5. Make a call to the device.
6. Answer the call from the accessory to verify HFP functionality, uplink and downlink audio on the accessory.
7. End the call.
8. Start streaming audio from the device to the accessory.
9. Verify that audio streaming is present on the accessory and that it can be paused from the accessory.

Expected Result:

1. Device should indicate disconnection from the accessory within 30 seconds.
2. Multi profile functionality should be restored automatically or manually.
3. Accessory should be able to answer the incoming call.
4. Call audio (uplink and downlink) should be present on the accessory.
5. Streaming audio should be present on the accessory.
6. Accessory should be able to pause the streaming audio.

5.3.1.2. Out of Range Reconnection during a Call, Multi Profile Accessory

Requirements: HFP, A2DP, AVRCP

Purpose: Validate proper multiple profiles disconnection detection and reconnection following an out of range event during a call.

Test Configuration:

1. The device and accessory are paired and connected.

Procedure:

1. Engage in a call with uplink and downlink audio on the accessory.
2. Take the accessory out of the range of the device.
3. Verify that the device shows disconnection to the accessory within 30 seconds.
4. Call audio should be routed to the device automatically or manually.
5. Bring the accessory back in the range of the device.
6. Wait 30 seconds and verify that the device shows connection to the accessory, if not automatically connected, attempt to connect from the accessory without power cycling the accessory.
7. If call audio is not automatically transferred to the accessory, initiate audio transfer from the accessory.
8. Verify that the call uplink and downlink audio resume on the accessory and that the call could be terminated from the accessory.
9. Start streaming audio from the device to the accessory.
10. Verify that audio streaming is present on the accessory and that it can be paused from the accessory.

Expected Result:

1. Device should indicate disconnection from the accessory within 30 seconds.
2. Multi profile functionality should be restored automatically or manually
3. Call audio should be present on the accessory.
4. Accessory should be able to end the call.
5. Streaming audio should be present on the accessory.
6. Accessory should be able to pause the streaming audio.

5.3.1.3. Out of Range Reconnection during Audio Streaming, Multi Profile Accessory

Requirements: HFP, A2DP, AVRCP

Purpose: Validate proper multiple profiles disconnection detection and reconnection following an out of range event during audio streaming.

Test Configuration:

1. The device and accessory are paired and connected.

Procedure:

1. Start streaming audio to the accessory.
2. Take the accessory out of the range of the device.
3. Verify that the device shows disconnection to the accessory within 30 seconds.
4. Audio streaming should resume on the device automatically or manually.
5. Bring the accessory back into the range of the device.
6. Wait 30 seconds and verify that the device shows connection to the accessory, if not automatically connected, attempt to connect from the accessory without power cycling the accessory.
7. Audio streaming should be routed to the accessory automatically or manually from the accessory.
8. Verify that audio streaming is present on the accessory and that it can be paused from the accessory.
9. Make a call to the device.
10. Answer the call from the accessory to verify HFP functionality, uplink and downlink audio on the accessory.

Expected Result:

1. Device should indicate disconnection from the accessory within 30 seconds.

2. Multi profile functionality should be restored automatically or manually.
3. Streaming audio should be present on the accessory.
4. Accessory should be able to pause the streaming audio.
5. Accessory should be able to answer the incoming call.
6. Call audio (uplink and downlink) should be present on the accessory.

5.3.2. Power Cycle Reconnection

5.3.2.1. Power Cycle Reconnection during Idle Mode, Multi Profile Accessory

Requirements: HFP, A2DP, AVRCP

Purpose: Validate proper multiple profiles disconnection detection and reconnection following an accessory power cycle during idle mode.

Test Configuration:

1. The device and accessory are paired and connected.

Procedure:

1. Power down the accessory.
2. Verify that the accessory shows disconnection to the device within 30 seconds.
3. Power up the accessory.
4. Wait 30 seconds and verify that the device shows connection to the accessory.
5. Make a call to the device.
6. Answer the call from the accessory to verify HFP functionality, uplink and downlink audio on the accessory.
7. End the call.
8. Start streaming audio from the device to the accessory.
9. Verify that audio streaming is present on the accessory and that it can be paused from the accessory.

Expected Result:

1. Device should indicate disconnection from the accessory within 30 seconds.
2. Multi profile functionality should be restored automatically or manually.
3. Accessory should be able to answer the incoming call.
4. Call audio should be present on the accessory.
5. Streaming audio should be present on the accessory.
6. Accessory should be able to pause the streaming audio.

5.3.2.2. Power Cycle Reconnection during a Call, Multi Profile Accessory

Requirements: HFP, A2DP, AVRCP

Purpose: Validate proper multiple profiles disconnection detection and reconnection following an accessory power cycle during audio a call.

Test Configuration:

1. The device and accessory are paired and connected.

Procedure:

1. Engage in a call with uplink and downlink audio on the accessory.
2. Power down the accessory.

3. Verify that the device shows disconnection to the accessory within 30 seconds.
4. Call audio should be routed to the device automatically or manually.
5. Power up the accessory.
6. Wait 30 seconds and verify that the device shows connection to the accessory.
7. If call audio is not automatically transferred to the accessory, initiate audio transfer from the accessory.
8. Verify that the call uplink and downlink audio resume on the accessory and that the call could be terminated from the accessory.
9. Start streaming audio from the device to the accessory.
10. Verify that audio streaming is present on the accessory and that it can be paused from the accessory.

- Expected Result:
1. Device should indicate disconnection from the accessory within 30 seconds.
 2. Multi profile functionality should be restored automatically or manually.
 3. Call audio should be present on the accessory.
 4. Accessory should be able to end the call.
 5. Streaming audio should be present on the accessory.
 6. Accessory should be able to pause the streaming audio.

5.3.2.3. Power Cycle Reconnection during Audio Streaming, Multi Profile Accessory

Requirements: HFP, A2DP, AVRCP

Purpose: Validate proper multiple profiles disconnection detection and reconnection following an accessory power cycle during audio streaming.

Test Configuration:

1. The device and accessory are paired and connected.

Procedure:

1. Start streaming audio over A2DP to the accessory.
2. Power down the accessory.
3. Verify that the device shows disconnection to the accessory within 30 seconds.
4. Audio streaming should be routed to the device automatically or manually.
5. Power up the accessory.
6. Wait 30 seconds and verify that the device shows connection to the accessory.
7. Audio streaming should be routed to the accessory automatically or manually from the accessory.
8. Verify that the audio streaming resumes on the accessory and that it can be paused from the accessory.
9. Make a call to the device.
10. Answer the call from the accessory to verify HFP functionality, uplink and downlink audio on the accessory.

Expected Result:

1. Device should indicate disconnection from the accessory within 30 seconds.
2. Multi profile functionality should be restored automatically or manually
3. Streaming audio should be present on the accessory.
4. Accessory should be able to pause the streaming audio.
5. Accessory should be able to answer the incoming call.
6. Call audio (uplink and downlink) should be present on the accessory.

Appendix I – Change History

Date	Revision	Description
November 2007	1.0	<ul style="list-style-type: none"> • First Revision
April 2008	1.1	<ul style="list-style-type: none"> • Updated test cases based upon feedback from the first round of validation testing at the CATLs. The Bluetooth SIG UEG also provided feedback in the HFP section.
April 2008	1.2	<ul style="list-style-type: none"> • Changed Test Plan name: Remove Implementation and replace with Compatibility • Changed name of voice recognition test cases
September 2008	1.3	<ul style="list-style-type: none"> • Updated test cases based upon feedback during the Pilot phase of testing.
January 2009	1.4	<ul style="list-style-type: none"> • Updated test cases based upon further feedback during the Pilot phase of testing. • Added additional test cases for AVRCP
February 2009	2.0	<ul style="list-style-type: none"> • Editorial updates
June 2009	2.1	<ul style="list-style-type: none"> • Added new test cases for Disconnection/Reconnection • Updated Expected Results in section in 2.3.1. • Clarified how rewind should work when at the beginning of the track, in section 3.3.2.11.
February 2010	2.2	<ul style="list-style-type: none"> • Updated Section 1.4 • Updated Test Case 2.5.1.2 • Updated 2.5.3.1 eSCO test case • Updated 3.2.1.3 test case procedure • Added new test cases 5.2.2.1 & 5.2.2.2